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ABSTRACT

In 1993, The Pennsylvania State Board of Education approved 15 performance-based education goals that contain 53 student learning outcomes. Boards of education and superintendents must create and implement strategic plans that specify how school districts and area vocational-technical schools will help students reach the intended outcomes. This paper takes the position that without access to the latest technology, learners receive less than a complete education. Contemporary communication and information technologies hold the potential for re-engineering traditional education and creating new learning communities. The paper proposes building learning communities through a Leadership and Human Resources Development Academy, which would design and perfect a human-resources development system. The academy would: (1) raise the level of awareness about information essential to strategic planning and re-engineering the learning experience; (2) provide assistance to school districts in various phases of strategic planning; (3) serve as a link between public- and private-sector institutions; and (4) help to develop multi-year action plans and acquire fiscal resources. School districts need help in strategic planning; the paper describes strategic-planning activities in the Philadelphia area and collaborative arrangements within southeastern Pennsylvania. Appendices contain information on strategic planning within intermediate units in the Philadelphia school system and information on using electronic delivery systems for educational restructuring. Contains 65 references. (LMI)

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ED 383 040

NEW HABITS OF MIND AND HEART: COLLABORATION AND STRATEGIC ALLIANCES

by

WARREN GROFF

FALL 1994

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NEW HABITS OF MIND AND HEART

Abstract

Between now and the year 2000, educators, community leaders, and policy makers in the United States will face challenges and make decisions that will determine the quality of life for a majority of Americans in the first half of the 21st century. An ultimate purpose of education is human resources development -- to provide society with the critical mass of intellectual capital and competent workforces to function culturally, socially, economically, technologically, and politically in the world of which they are a part. To accomplish that ultimate purpose, leaders implement planning processes to (a) guide policy-making, (b) develop institutions, and (c) allocate resources.

Pennsylvania State Board of Education (SBE) guidelines began to make reference to K-12 technology education in 1984 and in 1993 approved 15 performance-based education goals that contain 53 student learning outcomes. Boards of education and superintendents must create and implement strategic plans which specify how the school districts and area vocational-technical schools will help students reach the intended outcomes. One-third of the school districts completed strategic plans in 1993-94. Another third of the districts are developing strategic plans in 1994-95 and the remaining districts will develop strategic plans in 1995-96.

People are surrounded with technologies, undreamed of a generation ago, which make it possible to transmit data, voice, and video instantaneously almost anywhere in the world and simultaneously in several different languages. Although these technologies are becoming commonplace in business and are sometimes available to children in homes, they remain largely unavailable in traditional education. Without access to the latest contemporary technology, a learner is receiving less than a complete education. Global competitiveness is providing impetus for collaboration and strategic alliances for the development of competencies and skills beyond those available in traditional education.

Contemporary communication and information technologies hold the potential for (a) re-engineering traditional education and (b) creating entirely new info era learning communities. New Habits of Mind and Heart is a proposal to plan for "Building Learning Communities" to adapt through a Leadership and Human Resources Development Academy.

* * * * * * * * * *

Where there is no vision,
the people perish.
Proverbs 29:18

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THE GLOBAL CONTEXT

The United States became pre-eminent during the industrial era. Immediately after World War II, the U.S. had the biggest market in the world and generated 75% of the World's Gross Product (WGP) which was almost eight times as large as the rest of the world. The U.S. was wealthier than any other nation. In the 1950s, the U.S. had a per capita income twice that of the next country and eight times that of Japan. The U.S. could afford to do large scale projects that other countries could not undertake. U.S. citizens could afford goods and services that people in other countries could not purchase.

A great deal of the U.S. pre-eminence was attributable to the investment in research and development, evolution of planning and management know-how and technology, and research universities that produced intellectual capital. During and immediately after WW II, the U.S. created the largest R & D infrastructure in the world. Investment in the scientific establishment by the federal government and the private sector was unparalleled in the world. Product development required new ways of planning, managing, and evaluating the continuum extending from nurturing of ideas through production, distribution, and service of goods. Advances in science and technology increased in complexity.

Major expansion occurred in the 1950s and 1960s in all sectors of the economy, particularly manufacturing and services. Rapid advances in science and technology yielded global competition and modernization at an accelerating rate. Establishments that survived, modernized with new technology in the 1970s and early 1980s.

Pennsylvania was a world class leader during the industrial era, primarily because of natural resources such as anthracite coal and the infrastructure to produce steel. The collapse of big steel is an example of the failure to invest in new technology as well as deal with bureaucracy and productivity through human resources development. Between 1974 and 1986, 337,552 jobs were lost and brought the death of Pittsburgh's Mongahela Valley as America's steel capital (Hoerr, 1986).

During the 1980s, it became apparent that modernization of industrial era establishments was necessary, but insufficient. The surviving manufacturing sector establishments modernized several times with contemporary technology and then began to restructure. More important, however, a few establishments began to recognize the centrality of HUMAN RESOURCES DEVELOPMENT committed to Total Quality with world class Benchmarking Standards.

As the U.S. entered the 1990s, most of the above-mentioned and other advantages had disappeared. The U.S. had gone from 75% of the WGP in 1945 to less than 25% of the WGP in 1989. Manufacturing was particularly hard hit as can been seen in the decline of phonographs, color televisions, computer numerically controlled machines, and aircraft (see Attachment 1). With regard to per capita purchasing power, the U.S. is now only the ninth wealthiest country having been surpassed by Austria, Denmark, Germany, Japan, Norway, the Netherlands, and Sweden.

Three major areas are emerging in a new world economy. The European Union has 350 million people in 12 nations with a per capita income larger than that of the U.S.: The EU is moving toward integration. The North American Free Trade Agreement has a total population of 320 million people in Canada's 10 provinces, Mexico's 32 states, and the 50 U.S. states. The most dynamic region of the world is the Pacific Rim. The Republic of China (ROC) is currently the fastest growing economy. ROC has 22% of the world's population and has the fastest growing and largest middle class of people who want to buy products made by Western countries. Three-quarters of the economic opportunities are located outside the U.S. Furthermore, Western democracies will have a decreasing share of the world's population, dropping from 22% in 1950 to 15% in 1985, and to 9% in 2020.

The Organisation for Economic Co-operation and Development (OECD) has developed a uniquely internationally-comparable data base of indicators for sector analysis. The indicators for 13 of the 24 member nations cover five broad areas of manufacturing performance: business enterprise research and development; investment; international trade; employment; and production. Trends from an OECD study are
- The pre-eminence that the U.S. enjoyed across a wide variety of sectors has declined over the past two decades, but the U.S. still enjoys a considerable lead in many sectors, particularly the high technology industries.
- Where the U.S. has lost ground, it has usually been Japan that has gained. In many cases these gains have been usually broad-based, emanating from technology sectors.
- As Japan has gained, the group of European Community countries studied have seen the erosion of their position.

The globalization of the world economy is causing all nations to analyze human resources development policies and systems. Education, K through postgraduate, and training will be modernized and restructured through (a) internal initiatives and/or (b) forces external to the enterprise. The OECD Education Committee is completing a three year analysis of "The Changing Role of Vocational and Technical Education and Training" (OECD). The nations that co-create a clear vision of the future and re-engineer education will be more competitive and enjoy a higher quality of life.

U.S.'s WORLD SHARE

	1970	1987
Phonographs	90%	1%
Color Televisions	90%	10%
Computer Numerically Controlled Machines	100%	35%

Turning to Technology. Southern Growth Policies Board, 1989, p.7.

U. S. AIRCRAFT MANUFACTURING WORLD MARKET SHARE

1969	91%
1993	67%

HUMAN RESOURCES DEVELOPMENT (HRD)

Throughout the industrial era, communities of learners invented new mosaics of education experiences and formatted them within the limitations of the know-how, understandings, and technology of the times. The inventions included secondary schools, junior high schools, home economics and industrial arts courses, vocational tracks, jointures, area vocational- technical schools, middle schools, etc. In postsecondary education, society created normal schools that evolved into state teachers colleges, state colleges, and state universities. A broad range of institutes and two-year institutions were created. The educational infrastructure was based on provider-controlled principles.

The above-mentioned contemporary traditional education institutions represent only a very small part of the total resources that are allocated to meet the workforce training requirements for today's workplaces. Business and industry spend on training over five times the amount of money appropriated for public education. There are several types of HRD. The investment in HRD includes apprentice training, industry specific training such as in printing and graphic arts, job corps, prison rehabilitation and training, etc.

It is important to examine the "ends" of the education enterprise as a prelude to discussing the "means." Over the years several groups and persons have defined the purposes of elementary and secondary education in a democracy. The purposes of education in the American demographic society are the development of each person as (a) a worker, (b) a citizen, and (c) an individual. Thus, basic and higher education in the American democratic society have a vocational, a political, and a personal dimension.

Democratic societies throughout the world differ in the way in which they organize to meet the needs of the culture and economy of which they are a part. In addition to structure, policy and decision making range from highly centralized to highly decentralized "home rule." Education is essentially a state function in the U.S. The State Board of Education in Pennsylvania has implemented a strategy to help school boards and the communities they serve to develop new habits of mind and heart. Just as industrial era manufacturing has gone through several stages of modernization and restructuring, so too education and training must progress through stages of development. Policy makers, leaders, and service providers are being asked to break out of the mindset of industrial era formats and to creatively envision (a) cognitive outputs necessary for the 21st Century and (b) alternative formats with more effective learning experiences for very diverse populations. The human resources development strategy for creatively envisioning alternative futures is strategic planning.

American Public Education: Quality And Equality

Public basic education in the U.S. is based on concepts of quality and equality. Each person is to be provided equal **access** to a **high quality education** at a **reasonable cost**. Equality and access have gone through multiple interpretations. Equality today is interpreted to mean access to a developmentally appropriate curriculum to increase the likelihood of student success including the entitlement to meaningful employment. Federal and state policy created by legislative process and judicial interpretations direct the flow of resources to help achieve both equality of opportunity and promotion of quality.

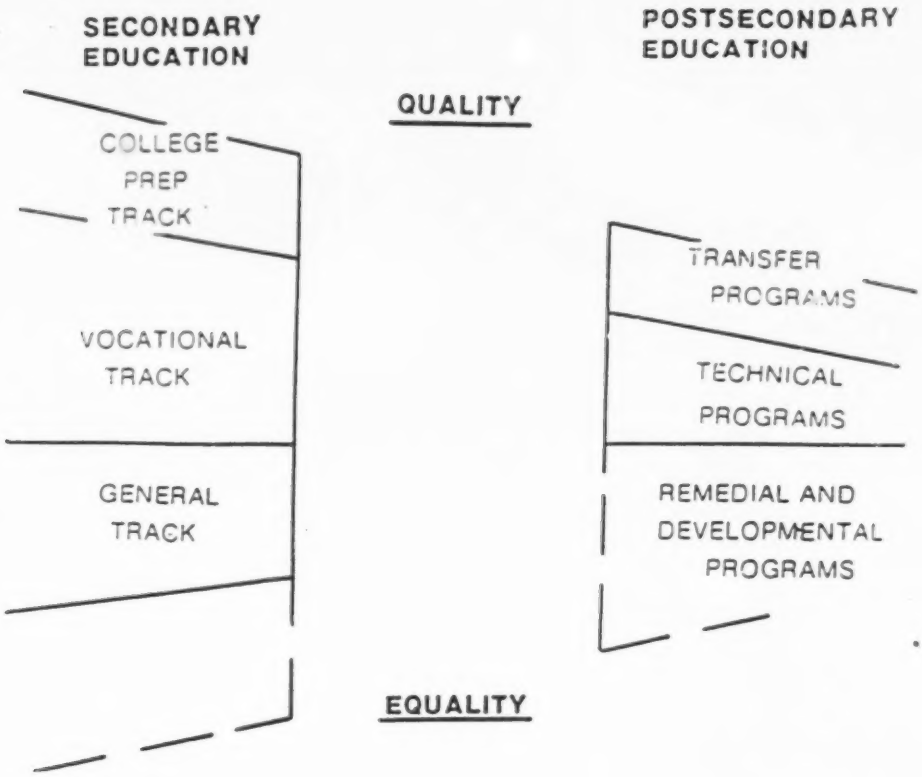
The elementary and secondary education system that has evolved consists of the academic, vocational-technical, and general tracks. About one-fourth of the students drop out. The academic college prep track tended to be articulated between secondary and postsecondary education. Articulation was based primarily on matching course and subject titles. Too often the standards were lowered in the 1960s and 1970s. Postsecondary institutions became more extensively involved in remedial and development education. Standards are being raised but resources will be encumbered for years to overcome deficits in preparation (see Attachment 2).

One essential issue is the synchronization of education with workplaces. Contemporary traditional formats tend to be discipline centered, layered by grade level, and provider controlled. The format assumes the content meets workplace needs. The format assumes a student can assimilate and retain sufficient knowledge and then apply it to solving problems in rapidly changing workplaces. Competencies and skills in America's workplaces are becoming increasingly more complex. Most jobs today require competency and skills that typically would be classified at a postsecondary level.

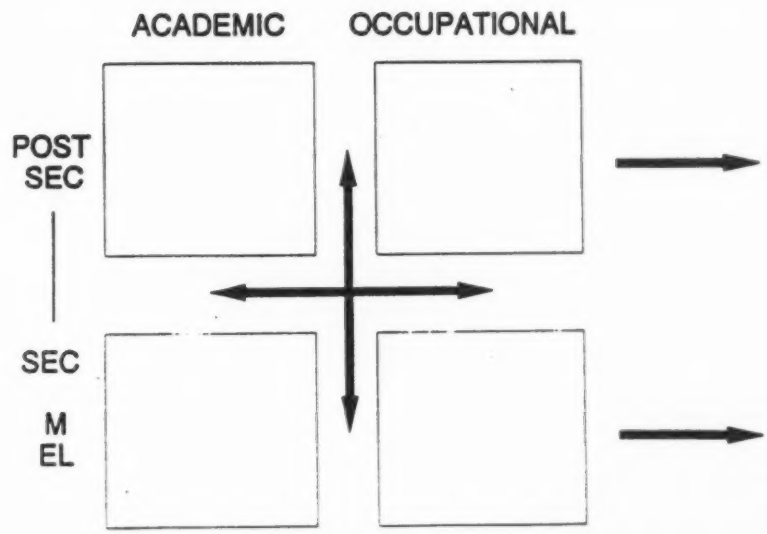
In the late 1970s, a few two-year institutions began to articulate technical programs with vocational programs at secondary schools and upper division technical programs in senior colleges in 2+2+2 formats. Program advisory committees comprised of community representatives provided input about bodies of knowledge and competencies and skills needed by workers. Secondary teachers and postsecondary faculty incorporated ideas into program sequences. DACUM (Developing A CUrriculuM) became a strategy for creating new programs as well as for program review (see Appendix B).

Technology makes it possible to develop more effective ways for maintaining the knowledge base and competencies and skills required of workers for various workplaces. Online formats will be far more effective and efficient.

EQUALITY: DUAL MISSION PRIORITIES



EDUCATION WORKPLACES



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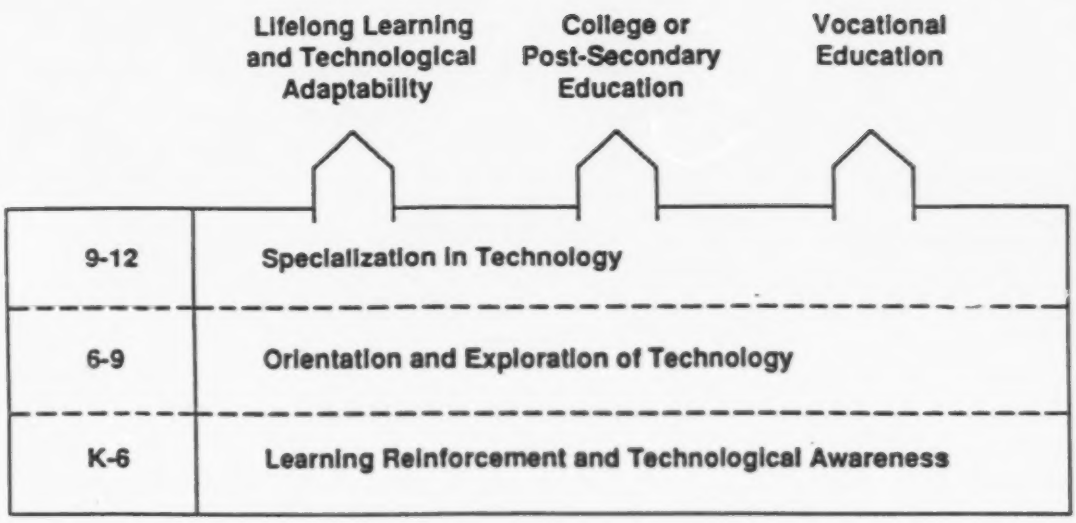
Student Learning Outcomes and Technology Education

The Pennsylvania State Board of Education (SBE) adopted 15 performance-based education goals. The six Common Core goals are self worth; information and thinking skills; learning independently and collaboratively; adaptability to change; ethical judgment; and honesty, responsibility, and tolerance. The nine Academic goals are communications, mathematics, science and technology, environment and ecology, citizenship, arts and humanities, career education and work, wellness and fitness, and home economics.

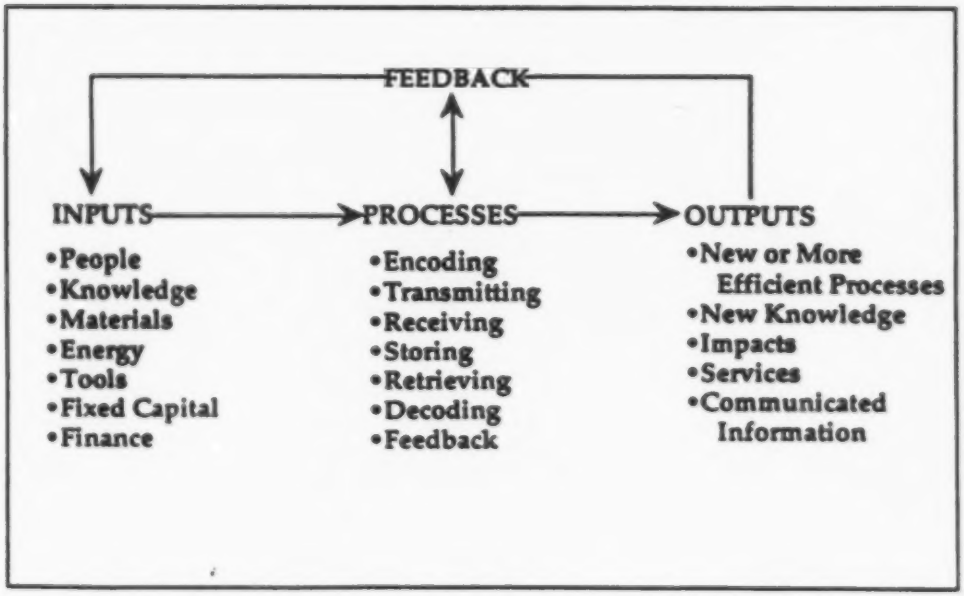
In Pennsylvania, technology education encompasses the total school program, K-12. Students who go through an articulated technology education should be better prepared for lifelong learning and technological adaptability, college or postsecondary education, or vocational education. The focus in the K-6 years is on learning reinforcement and technological awareness. In grades 6-9, the focus is on orientation and exploration of technology. Specialization in technology occurs in grades 9-12 (see Attachment 3).

Technology education in Pennsylvania is based on six systems: communications, transportation, construction, manufacturing, bio-related, and engineering. Inputs, processes, and outputs are specified for each of the five systems. School districts have flexibility to develop instructional strategies to match the economy of which they are a part. For example, a school district could focus many learning activities on the bio-related and communications systems if the economy had a concentration in biotechnology. However, providing equal access to high quality programs at a reasonable cost for all students will no occur if visions are confined to traditional education formats.

Pennsylvania prepares students in vocational-technical education (VTE) through 84 area vocational-technical schools (AVTS), 513 high schools, and 87 postsecondary institutions. VTE enrollments dropped from 216,910 in 1983-84 to 107,920 in 1991-92 and program completers dropped from 52,711 to 21,654 during the same time period. Program review will be a critical issue - equal access to high quality programs. Most of the AVTS will engage in strategic planning in Phase 3 during 1995-96. Strategic planning for the SBE will occur in concert with requirements for legislation like the Carl D. Perkins Vocational and Applied Technology Education Act (Public Law 101-392), "Goals 2000: Education America Act" (P.L. 103-227), and the "School-To-Work Opportunities Act" (P.L. 103-239). Global economic forces as well as federal and state governmental mandates must be brought together in a comprehensive vision of modernized and restructured "full service" caring and learning environments which meet world class standards and are synchronized with workplace needs.



THE COMMUNICATION SYSTEM



STRATEGIC PLANNING: SYNCHRONIZING EDUCATION AND SOCIETY

Strategic planning is a process for human resources development (HRD). It is a process to assist empower a "community of learners" to co-create an **IDEAL** vision of the future with improved quality of life as well as specify the **REAL** conditions of the context in which they live and work. The comparison of the two yields **NEEDS**.

IDEAL What can be
REAL What is
NEEDS What needs to be done

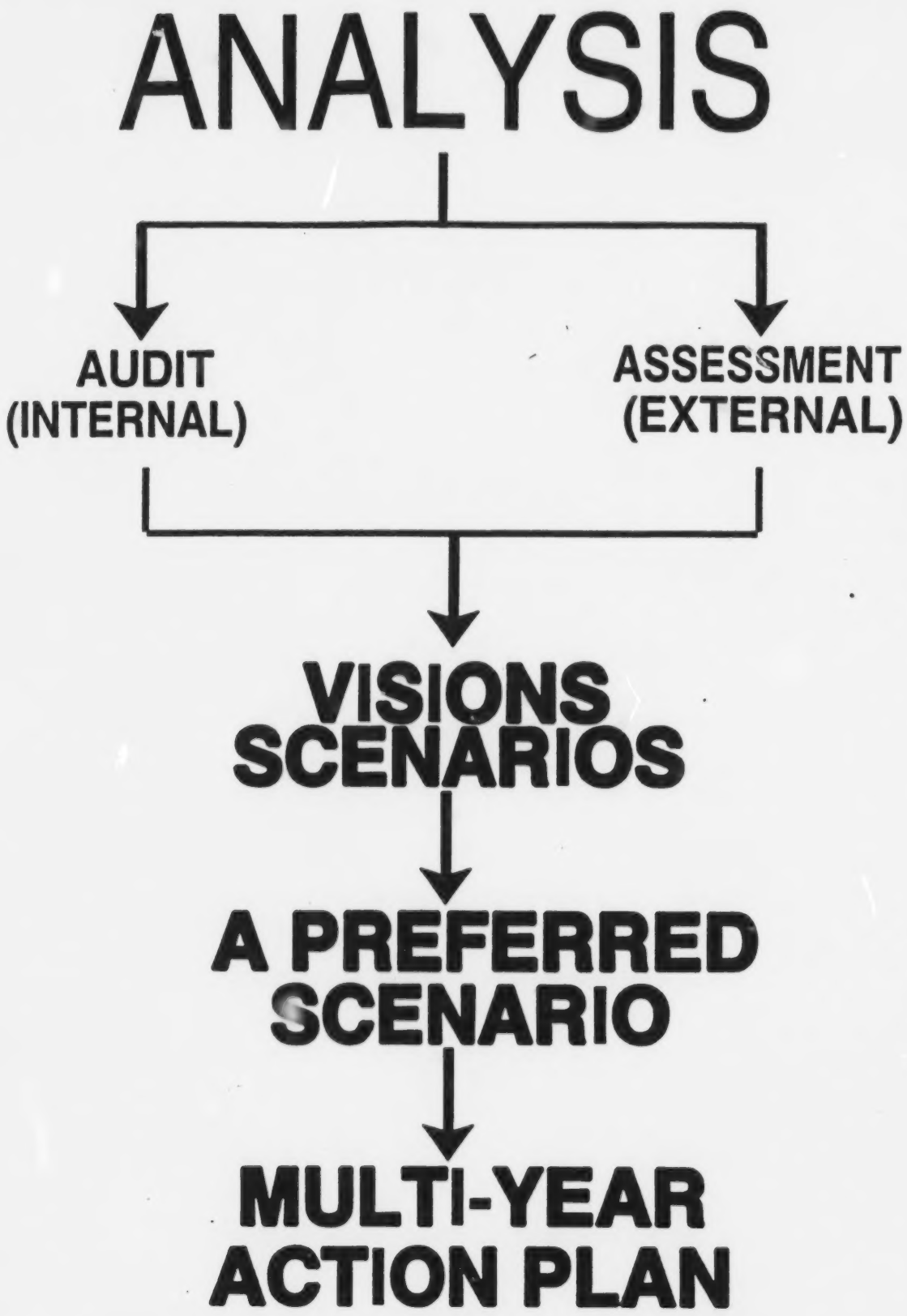
The **NEEDS** must be transformed into strategic key result areas with multi-year goals and objectives with benchmarks. One outcome of active participation in a sound strategic planning process is the **co-created** multi-year action plan for which the critical mass of participants have "learned to learn" what needs to be done to adapt to the dynamic and rapidly changing society of which they are a part.

Components of Strategic Planning

Strategic planning includes two analyses, an audit of an establishment's **internal environment** and an assessment of an establishment's **external environment**, for the purpose of creating and co-creating **visions** of the future, a number of alternative scenarios. After alternative scenarios have been co-created more fully, then a multi-year operational or tactical action plan is specified to which resources are linked (see Attachment 4). Planning and budgeting must be linked together to guarantee the process is more than an academic exercise and will yield a high return on investment for all consumers and stakeholders.

Many institutions have improved the audit of the internal environment primarily because of demographic change or budget constraints. Even with the emphasis on student learning outcomes assessment and the total quality movement, very few education establishments have pursued program review from a perspective of workforce and workplace needs. A few institutions have made some progress on assessing the external environment - demographic, social economic, technological, governmental planning variables. Very few institutions have created and co-created visions of the future and specified alternative scenarios with the intellectual rigor that embraces the latest know-how in the art and science of strategic thinking. What will life and work be like in the 21st Century with more complex advances in science and technology? What competencies and skills are essential to function in the workplaces of the 21st Century?

Assessment of the external environment requires the systematic extrapolation of data and their interpretation. Then, systems must be analyzed. An example is provided of a few variables and their relation to education and training.


ANALYSIS
AUDIT
(INTERNAL)
ASSESSMENT
(EXTERNAL)
VISIONS
SCENARIOS
A PREFERRED
SCENARIO
MULTI-YEAR
ACTION PLAN

Economic and Technological Variables

The Census Bureau collects information about employment outlook using ten major categories, four of which are labeled goods (agriculture, mining, construction, and manufacturing) and six of which are services (finance, government, transportation and utilities, self-employed, wholesale and retail, and services). The ten categories of economic establishments are a composite of many types of businesses including manufacturing (#4) and services (#9). Two areas in manufacturing that are essential to the viability of the U.S. are **printing and publishing** #8 and **electric and electronic equipment** #9 (see Attachment 5). Data are collected in years ending in a "2" and a "7."

The Bureau of Labor Statistics analyzes number and type of jobs using the Standard Industrial Classification (SIC). BLS uses historical data with a series of variables to project changes in employment outlook. Although national trends are rather accurate, regional and state profiles are dependent on local variables such as economic restructuring.

Technological variables are not classified in a manner such as economic variables. Some technologies apply to all establishments such as communication and information technology. Communication and information technologies are essential to everyone because of the relationship to **literacy, productivity, and democracy**. The information explosion has gathered force over the past 40 years. Creating "intelligence" via computer and dissemination by communication and information technologies is the classic tool for creating wealth (Wriston, 1992). Technologies are fundamentally changing the way communications occurs.

Ponder the following advances in technology:

In 1955, it was hand set type and the platen press.

In 1981, it was the PC.

In 1985, it was desktop publishing.

In 1989, it was voice activated technology and desktop presentations with sophisticated graphics.

In 1993, it was voice activated typewriters and electronic books.

In 1994, it is multilingual continuous voice activated desktop videoconferencing which minimizes geographic, language, physical and temporal restrictions.

In 1995, it will be asynchronous transfer mode (ATM) technology with continuous voice activated software on a PC using cellular-wireless communications technology to access databases through local area and wide area networks.

There are at least 36 vendors producing ATM technology. ATM technology is being used by hundreds of corporations. ATM technology is being used this year in 52 high schools, 18 community colleges, and 16 universities in one state.

ECONOMIC ESTABLISHMENTS

1. Agricultural services, forestry, fisheries
2. Mining
3. Contract construction
4. Manufacturing
5. Transportation & public utilities
6. Wholesale trade
7. Retail trade
8. Finance, insurance, real estate
9. Services
10. Non-classified

MANUFACTURING (#4) ESTABLISHMENTS

1. Food & Kindred Products
2. Tobacco
3. Textile Mill Products
4. Apparel & Other Textile Products
5. Lumber & Wood Products
6. Furniture & Fixtures
7. Paper & Allied Products
8. Printing & Publishing
9. Chemical & Allied Products
10. Petroleum & Coal Products
11. Rubber & Misc. Plastic Products
12. Leather & Leather Products
13. Stone, Clay & Glass Products
14. Primary Metal Industries
15. Fabricated Metal Products
16. Machinery, Except Electrical
17. Electric & Electronic Equipment
18. Transportation Equipment
19. Instruments & Related Products
20. Miscellaneous Manufacturing Industries
21. Administrative & Auxiliary

SERVICES (#9) ESTABLISHMENTS

1. Hotels & Lodging Places
2. Personnel Services
3. Business Services
4. Auto Repair Services
5. Miscellaneous Repair Services
6. Amusement & Recreational Services
7. Health Services
8. Legal Services
9. Educational Services
10. Social Services
11. Museums, Botanical, Zoological
12. Membership Organizations
13. Miscellaneous Services
14. Administrative & Auxiliary

Phases of Strategic Planning

There are several phases of strategic planning. The "plan to plan" phase is extremely important because it is during this period that confidence and trust are created and the parameters of the planning process are specified which then guide behavior during the planning period. The approaches to "plan to plan" vary considerably based on climate, culture, and a mosaic of variables that help to characterize the context. At the time Pittsburgh was being devastated by the decline of big steel, Phoenix was leading the U.S. in rapid expansion. Phoenix and Pittsburgh were the ends of the "expansion" to "contraction" continuum with most municipalities in the middle "steady state" category.

During the plan to plan phase, the commitment must be established to complete a comprehensive contextual analysis. The audit of the internal environment is relatively easy in comparison to the assessment of the external environment. Disclosure of the "facts" and an objective discussion of the trend lines for internal variables extrapolated into the future may pose problems. The assessment of the external environment is too often casual or superficial and deprives the participants of the levels of understanding which are necessary to think seriously about alternative scenarios. If participants are unfamiliar with advances in science and technology, how can they possibly understand the impact on workforce competencies or workplace restructuring? If participants are not proficient at a minimum level with some technologies, how can they interpret long-term impact on life and work and for restructuring institutions?

The strategic planning phase is a period during which the process must have the highest priority possible on the board's agenda and the district leaders agendas. District leaders is plural because there are many stakeholders in governance even though state statutes specify accountable authorities. Teachers and service providers are critical because the extent to which strategic planning yields a high return on investment is directly proportional to "buy-in" during the planning phase. Effective communications is critical. Formatting the output of the planning discussions is essential. Planning and budgeting are tandem functions. Provision must be made for managing plan implementation, evaluating, and reporting key result areas.

Conceptual frameworks for formatting goals and objectives are critical. Formats can facilitate or inhibit goal attainment and the collection, analysis, and reporting of data. One format is the America 2000 goal categories (see Attachment 6). The goal categories have changed between 1989 and the passage of P.L. 103-227 last year. What are the benchmarks that are realistic by year 2000?

America 2000 Goals and Objectives, Public Law 103-227

1995-96 1996-97 1997-98 1998-99

1. School Readiness
a. Preschool programs
b. Parent as first teacher
c. Nutrition & health care

2. School Completion
a. Reduce dropout rate
b. Reduce minority gap

3. Student Achievement
a. Improve performance
b. Basic skill subjects
c. Citizenship
d. Physical education
e. Language
e. Diverse cultures

4. Teacher Education and Professional Development
a. Access to meet student needs
b. Access to emerging new methods
c. Attract new talent
d. Establish partnerships

5. Math and Science (+ Technology)
a. Student outcomes
b. Teachers
c. Undergrad & grad

6. Adult Literacy and Lifelong Learning
a. Education and work
b. Worker knowledge
c. Programs, (+ Libraries)
d. Enter college
e. College skills
f. Adult literacy

7. Safe, Discipline, and Drug-Free
a. Drugs and alcohol policy
b. Entire community action
c. Free of violence
d. K-12 D & A curriculum
e. D & A in K-12 health ed
f. Community based teams
g. Eliminate sexual harassment

STRATEGIC PLANNING IN SCHOOL DISTRICTS IN GREATER PHILA

Seventeen school districts in Bucks, Chester, Delaware, and Montgomery counties created strategic plans in Phase 1 in 1993-94. Eighteen school districts and three AVTSs are creating strategic plans in Phase 2 in 1994-95. Twenty-seven school districts and 18 AVTSs in the above-mentioned counties and Philadelphia will complete strategic plans in Phase 3 in 1995-96. Most AVTSs, and Centers, are scheduled for Phase 3 (see Attachment 7 and Appendix A).

Several educational institutions will produce strategic plans with excellent statements of beliefs, mission, goals and objectives, strategies and action steps. Some districts will do a good job in relating the above-mentioned components to benchmarks for achieving high levels of students' learning outcomes, including technology education. The creation of a strategic plan that results in consensus must be refined into a multi-year action plan with resources assigned. Very often, the step to link resources to intentions becomes a major hurdle to successful tactical plan implementation. There is no doubt that more effective learning, the "ends" of the business, can be achieved for more students of all ages through appropriate use of technology. However, creating the education technology part of a comprehensive strategic plan is a very complex task. The education technology component must be based on learning experiences necessary for students to achieve a level of understanding, perhaps proficiency, about know-how and technology used in the society of which education is a part. In addition, the education technology component must include the know-how and technology to deliver high quality learning experiences by teachers and service providers. The "seeds" for this base of understanding must be planted during the plan to plan phase and must be systematically cultivated and nurtured each year during implementation. Determining priorities for allocating resources to implementing the technology component will becomes increasingly more complex.

School districts will set goals and objectives to be accomplished over the next few years which will relate to school readiness, school completion, student achievement, math and science, and other key results areas. School districts can undertake professional development programs unilaterally or through strategic alliances with other establishments. "Community colleges" are natural alliance partners because (a) their primary function is excellence in teaching and (b) they derive most of their financial support from local sponsorship and student tuition. Furthermore, there tends to be a parallel configuration of programs which are a reflection of the economy of which they are a part. Community colleges could engage in a complimentary strategic planning process to synchronize more closely career ladder output at various levels - diploma, certificate, and degree.

Strategic Planning by School Districts in Greater Phila Area

	1993-94 Phase 1	1994-95 Phase 2	1995-96 Phase 3	1996-97	1997-98	1998-99
22 Bucks	7					
		5 + 1				
			1 + 2			
	G 1 Readiness					
	G 2 Sch Compl					
	G 3 Student A					
	G 4 Prof Dev					
	G 5 Ma Sci Te					
23 Montg	3					
		3 + 1				
			16 + 3			
	G 1 Readiness					
	G 2 Sch Compl					
	G 3 Student A					
	G 4 Prof Dev					
	G 5 Ma Sci Te					
24 Chester	2					
		5 + 1				
			5			
	G 1 Readiness					
	G 2 Sch Compl					
	G 3 Student A					
	G 4 Prof Dev					
	G 5 Ma Sci Te					
25 Delaware	5					
		5				
			5 + 2			
	G 1 Readiness					
	G 2 Sch Compl					
	G 3 Student A					
	G 4 Prof Dev					
	G 5 Ma Sci Te					
26 Phila			1 + 11			
	G 1 Readiness					
	G 2 Sch Compl					
	G 3 Student A					
	G 4 Prof Dev					
	G 5 Ma Sci Te					
Totals	17	18 + 3	27 + 18			

Key:
5 + 1 School Districts + AVTS

Collaboration and Strategic Alliances in Southeastern PA

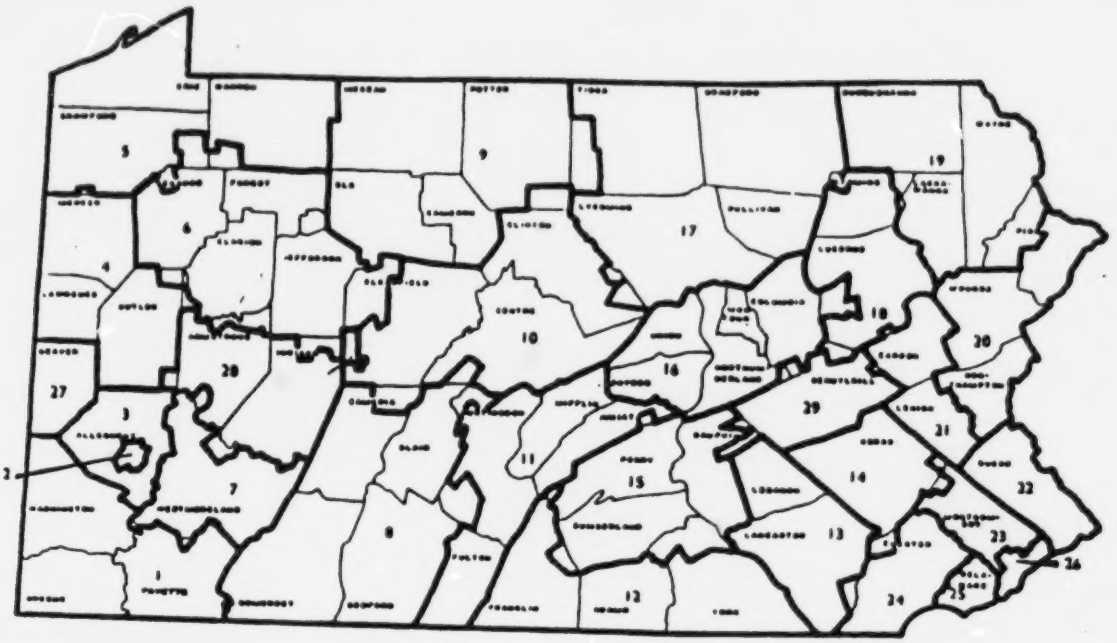
Collaboration and strategic alliances could include all of Southeastern Pennsylvania. The Technology Council of Greater Philadelphia (TCGP) has a twofold purpose:

> We exist to help regional companies introduce more products into more markets faster, using more regional technology. We also place a priority on transferring knowledge and technology, in order to make small and large companies and our regional universities more globally competitive.

TCGP merged with the Technology Council of Central Pennsylvania (TCCP) to form the Eastern Technology Council in 1994 in an effort to assist establishments become more competitive with other regions of the U.S. and the world. The region has access to the data bases of the Greater Philadelphia Economic Development Corporation (GPDC). The Franklin Institute has extensive experience with know-how and technology transfer through teacher education and inservice. The Franklin Institute, with Drexel University, and TCGP, has proposed "The Greater Philadelphia Consortium for Science and Technology Education and Training: A Public/Private Partnership." The Pennsylvania Technical Assistance Program and other organizations are critical players in the emerging new global information era.

Amstrong World Industries is a classic example of a corporation that has improved the quality of life for millions of consumers and providers. Armstrong is primarily a manufacturer of furniture, interior floor coverings, and building products. Armstrong has 21,000 employees worldwide and established a joint venture in China in 1990 which has evolved into a new wholly owned trading company. Armstrong World Industries (China) Ltd, headquartered in Shanghai, will market ceiling and floor products in China. Armstrong added more than 200 new sheet flooring and tile products in 1993 and has extensive experience with the Malcolm Baldrige National Quality Award. Armstrong, Hamilton Bank, and the Lancaster Newspapers, Inc., formed a partnership in 1988 with Lancaster School District and Millersville University to provide educational scholarships for minority youth.

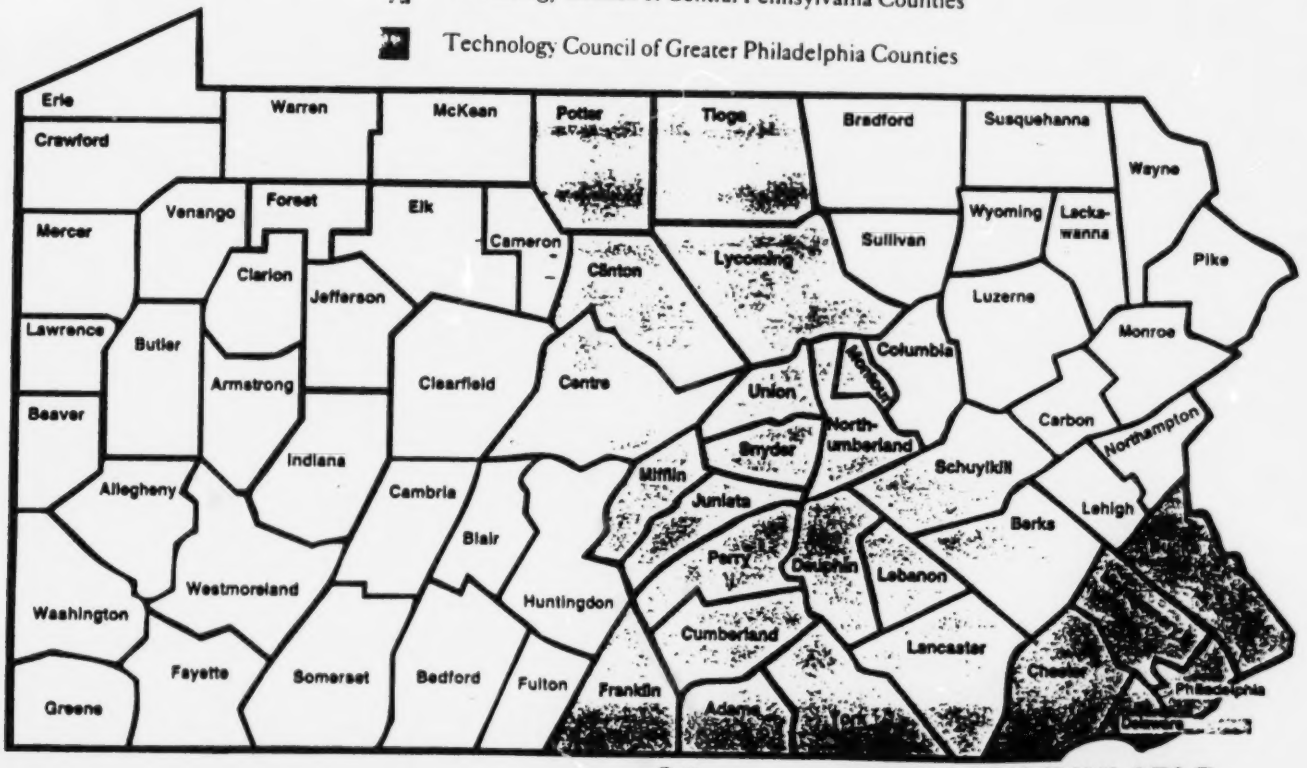
Many advantages could be listed for including all of Southeast Pennsylvania. Millersville University has a well established program in technology education and several faculty have made significant contributions to the movement. Millersville University is also the site of the Governor's School for Teaching. Attracting, preparing, and retaining talented people in education is critical. Intermediate Units in Southeastern Pennsylvania and the areas covered by the two above-mentioned technology councils are displayed in Attachment 8. Strategic planning for school districts in Southeastern PA is displayed in Attachment 9.



1. Intermediate Unit 1
2. Pittsburgh-Mount Oliver
3. Allegheny
4. Midwestern
5. Northwest Tri-County
6. Riverview
7. Westmoreland
8. Appalachia
9. Seneca Highlands
10. Central
11. Tuscarora
12. Lincoln
13. Lancaster-Lebanon
14. Berks County
15. Capital Area
16. Central Susquehanna
17. Blast
18. Luzerne
19. Northeastern Educational
20. Colonial Northampton
21. Carbon Lehigh
22. Bucks County
23. Montgomery County
24. Chester County
25. Delaware County
26. Philadelphia
27. Beaver Valley
28. Arin
29. Schuylkill

Technology Council of Central Pennsylvania Counties

Technology Council of Greater Philadelphia Counties



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Strategic Planning by School Districts in Southeastern PA

Fifty-seven school districts in southeast PA created strategic plans in Phase 1 in 1993-94. Fifty districts and nine AVTSs are creating strategic plans in Phase 2 in 1994-95. Eighty-one school districts and 28 AVTSs will complete strategic plans in Phase 3 in 1995-96.

	1993-94 Phase 1	1994-95 Phase 2	1995-96 Phase 3	1996-97	1997-98	1998-99
Inter Unit						
12 Lincoln	8	6 + 2	11			
13 Lancaster	6	4	10 + 4			
14 Berks	8	5 + 2	5			
15 Capitol	9	6 + 1	9 + 2			
20 Colonial	4	3	6 + 2			
21 Carbon	1	4	9 + 2			
22 Bucks	7	5 + 1	1 + 2			
23 Montg	3	3 + 1	16 + 3			
24 Chester	2	5 + 1	5			
25 Delaware	5	5 + 1	5			
26 Phila			1 +11			
29 Schuylkill	4	4 + 1	4			
Totals	57	50 + 9	81 +28			

Key:
6 + 2 = School Districts + AVTSs

LEADERSHIP AND HUMAN RESOURCES DEVELOPMENT ACADEMY

Leadership and human resources development are the critical ingredients in "learning to learn" to adapt to a complex, dynamic, and rapidly changing society. Leadership and human resources development academies have been emerging over the past decade. Academies have changed their function and role over the years to respond to the requirements of their sponsors. Just as it is possible to identify technologies that are critical for the 21st Century, so too it is possible to identify bodies of knowledge that must be understood for restructuring education. These areas include how the mind functions and systems (see Attachment 10).

Mind

Research in the cognitive sciences will play a major role in re-engineering education. This includes research about learning styles and what is learned through technology such as magnetic resonance imaging (MRI). Scientists can now peer into the human brain through MRI and observe changes that occur as the mind works (Begley, 1992; Blakeslee, 1993; and Gelman, 1992). Imagine being able to observe cognitive synapses while a human is engaged in the inputting, processing, and outputting information such as the integration of math and science to solve problems. Brain-actuated control has been developed in several labs across the world. Electrodes attached to the head key in on brain waves and monitor them for voltage changes which are then interpreted as computer commands (Shine, 1994). People have turned lights and TVs on and off, operated typewriters, and moved cursors across video screens.

What is important is to understand what basic research exists and how that body of knowledge can be applied to enhance learning effectiveness. Research about interaction analysis became a basis for some work at Research for Better Schools in the 1960s and 1970s. Research about learning styles led to the Center for the Study of Learning and Teaching Styles and the Learning Styles Network co-sponsored by the National Association of Secondary School Principals and St. John's University in NY. Continued research on how the mind works led to the Brain Based Education Network coordinated by The Institute for Learning and Teaching at the Center for the Advancement of Reform in Education.

A second focus of inquiry relates to online learning. Two decades ago it would not have been possible to create a system to deliver education and training into the community, home, or workplace. Any Home A Classroom (Halperin, 1984) and The Education Utility (Gooler, 1986) describe technology intensive delivery systems. In 1986, The New York Institute of Technology announced that a student could complete an undergraduate degree at home via a modem and PC. While a

HUMAN

RESOURCE

DEVELOPMENT

HRD

MIND	SYSTEMS
Persons	*Databases*
Communities	Networks

few communities may still be debating telephone access in a classroom, children and youth are surfing the Internet at home (Hancock and French, 1994) or in charter schools (Kolderie, 1994). Home based learning increased dramatically during the 1980s. A few students educated at home have graduated at the top of their college class. It is possible to extend performance based education models and envision online learning communities based on a conceptual framework of problem based or solution based learning.

A third area relates to visioning. Research over the past fifteen years indicates that visioning alternative futures varies by planning style. This type of research is important to participating districts as they envision an alternative scenarios and create a multi-year action plan to develop a partial technological delivery system.

Systems

The second of the two major categories, systems, has a focus on databases and networks.

The U.S. National Information Infrastructure (NII) initiative has accelerated. Vice President Gore is chairing the initiative on Making Government Work: The Electronic Delivery of Federal Services (1993). Commerce Secretary Brown chairs the Information Infrastructure Task Force Committee on Applications and Technology which produced Putting the Information Infrastructure to Work (1994) that addresses manufacturing, commerce, health care, learning, environment, libraries, and government service delivery. The Federal Quality Institute provides access to numerous total quality documents through its Information Network (1993). The Office of Science and Technology Policy of the Executive Office of the President has focused activities on a "Societal Learning System." The Advanced Technology Program has funded 70 projects for the development and application of software and informmation technology. "Goals America: Educate America Act" (Public Law 103-227) refined the mission of the Office of Educational Research and Improvement in the U.S. Department of Education to assist in building "Pathways to a National Learning Community." The Pennsylvania General Assembly passed Act 62 in 1993 to provide incentives to phone companies to accelerate deployment of their fiber optic networks. Appendix B contains information relevant to this section.

CHESCONet and the Montgomery County Intermediate Unit's on-ramp to Internet provides access to databases through networks that provide an opportunity to create entirely new "full service" learning environments. Even a casual glance at Attachment 11 provides a bit of understanding of the potential for accessing information through Internet. New Habits could be made available through the system.

Gopher to Montgomery County Intermediate Unit

4. United States/

40. Pennsylvania (Other states can be selected to "surf")
4. CHESCO NET/ (Access to Nat Center for Res in Voc. Ed.)
8. Connectivity Center in West Chester/
11. Drexel University/
26. Lehigh University/
28. Millersville University/
29. Montgomery County Intermediate Unit Gopher Server/
33. PREPnet/
36. Penn State University/
39. Research for Better Schools/

29. Montgomery County Intermediate Unit Gopher Server/
1. About Montgomery County Intermediate Unit
2. More information about the MCIU, IUs and Districts/
3. Calendar of upcoming Events, workshops, conferences/
4. MCIU Online Resource Center/
5. MCIU Projects/
6. Interface: MCIU Education Technology Newsletter/
7. Libraries/ Research on the Internet/
8. Selected Resources for Educational Administrators/
9. Selected K-12 Educational Resources by Subject/
10. Areas of General Interest/
11. Gopher Servers Worldwide by Geographic Location/
12. Searching the Internet (Verica, Archie, Jughead)/
13. WAIS-based Information Searching/

2. More information about the MCIU
1. Information about the MCIU/
2. Other Pennsylvania IU or School District Servers/
3. Abington School District (Phase 3)
4. Cheltenham School District (3)
5. Colonial School District (3)
6. Hatboro-Horsham School District (1)
7. Jenkintown School District (2)
8. Lower Merion School District (3)
9. Lower Moreland School District (3)
10. Methacton SD (3)
11. Norristown SD (1)
12. North Penn SD (3)
13. Perkiomen SD (3)
14. Pottsgrove SD (3)
15. Pottstown SD (3)
16. Souderton SD (3)
17. Springford SD (3)
18. Springfield SD (1)
19. Upper Dublin (3)
20. Upper Merion (2)
21. Upper Moreland (3)
22. Upper Perkiomen (3)
23. Wissahickon (3)

The Academy

The purpose of the Academy would be to (a) raise the level of awareness about bodies of information that are essential to strategic planning and re-engineering the learning enterprise; (b) provide assistance to school districts in the various phases of strategic planning, managing, and evaluating; (c) serve as a link to private and public sector establishments; and (d) help in developing multi-year action plans and in acquiring fiscal resources. To use systems in a meaningful way in re-engineering education requires a basic understanding of (a) hard technology, (b) soft technology, (c) systems design, (d) HRD multi-media, and (e) policy (see Attachment 12).

The Academy would help leaders and policy makers focus discussions on (a) **policies** and (b) **programs and projects**? A policy statement such as "All children should have access to databases and information highways from home and school" requires careful analysis in developing the education technology component in a district, intermediate unit, or statewide strategic plan. Education technology includes the hardware and software for technology education and the application of technology to enhance all learning.

One program of high priority could be to reduce the devastating impact that economic-societal restructuring is having on children and youth. What adjustments can be made to improve readiness to learn at all levels? A study by the Carnegie Corp. of New York (1994) ranked the United States last among industrialized nations in three categories: health care for children, subsidized child care, and family leaves for parents with young children. Lisbeth Schorr, a lecturer in social medicine at Harvard University stated

> The scientific evidence documenting the early roots of crime and violence is overwhelming.... Society pays dearly when the fundamental building blocks of health development are not in place during the infant and toddler years" (Neglected Kids, 1994).

Nationally, less than 60% of all children were fully vaccinated at age 2 in 1992 (Powers, 1993).

A school district may create an outstanding strategic plan with goals and objectives to impact on key result areas only to find that multiple streams of service providers are hindered by bureaucratic jurisdictional regulations. Desired outcomes can only be achieved when purposeful human activity can be coordinated through the strategic plans of multiple community agencies. The Academy could be a primary resource for interestablishment strategic planning to create a CHESCONet type network that can be an integral part of the Community Learning and Information Network in Attachment 13 and 21st Century Learning and Health Care in the Home (1992) in Attachment 14.

Leadership and Human Resources Development Academy Programs

1995-6 1996-7 1997-8 1998-9 1999-2000

Mind
Basic Research
Applied Research
(Problem Based Learning
at Medical Coleges)
Visioning

Hard Technology
ATM
Cellular
Communications
Digital
Distance Education
Electronic Publishing
Voice Activiated
ENHANCEMATE
IN CUBE
VERBEX

Know-How Technology
Strategic Planning
ISO 9000
Needs Assessment
Outcomes Based Educ
Performance Funding
Program Review
Site Based Management
Tech Prep
Total Quality

Systems Design
NASDC
Roots and Wings
Co-NECT
CLC
Edison Project
EduTech
Electronic Village
Libraries & Media Centers

HRD Multi-Media
Nat. Tech. Univ.
Univ. of the World
EADTU
Nova

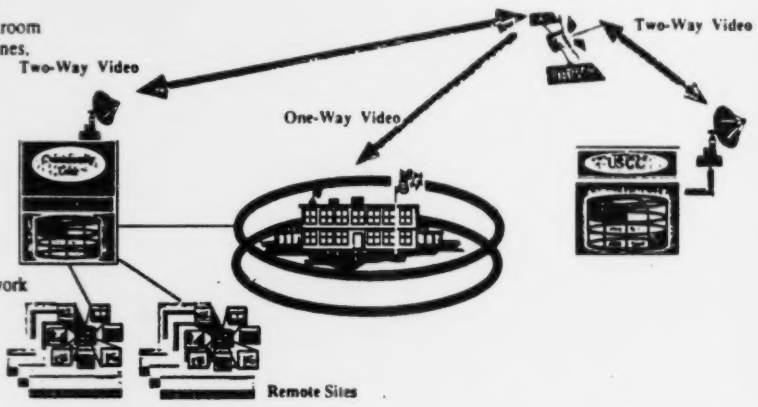
Policy (All Levels)
Research & Development

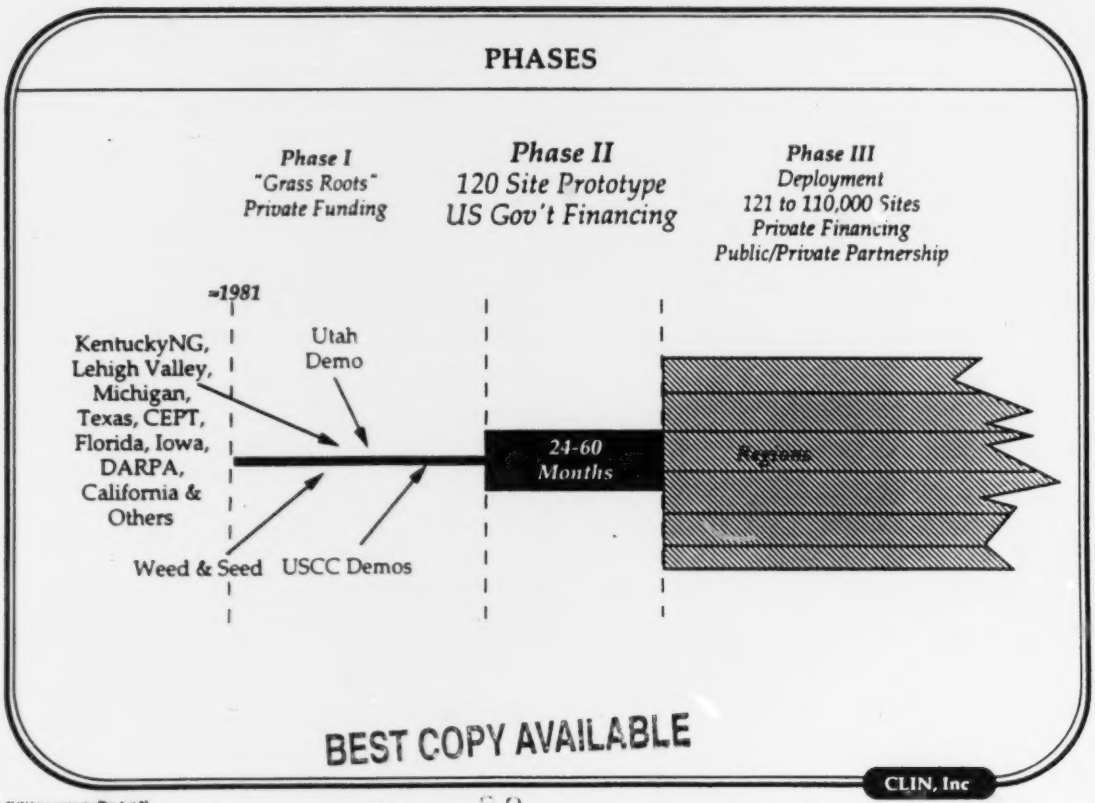
The Composition of a Prototype Community Learning and Information Network Site

The first 120 sites selected for implementation will require hardware and necessary adjustments to existing facilities to be fully operational.

Each site will be initially equipped with:

- A fully two-way interactive video classroom for 25 parucipants (monitors, microphones, camera, etc.)
- Video satellite antenna
- A data storage and retrieval computer
- 2 teacher's computer workstations
- 25 multimedia desktop computers
- Training
- Maintenance etc
- Power / phone line installation & site work





21ST CENTURY LEARNING AND HEALTH CARE IN THE HOME:

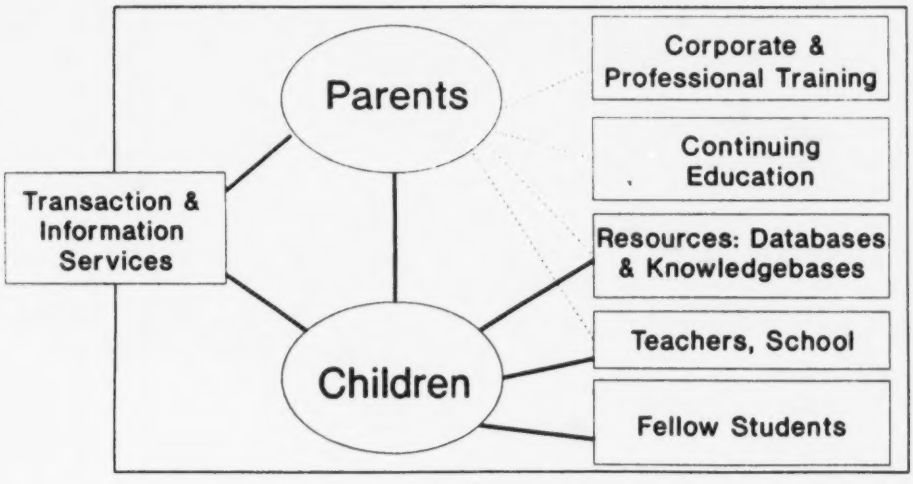
CREATING A NATIONAL TELECOMMUNICATIONS NETWORK

108 North Alfred Street
Alexandria, VA 22314
(703) 684-5880

1631 Suter's Lane N.W.
Washington, D.C. 20007
(202) 333-6035

POTENTIAL ELECTRONIC FAMILY LEARNING ENVIRONMENT

FIGURE 1



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A second high priority relates to understanding the communication system which is evolving and integrating that body of knowledge into a curriculum with developmentally appropriate content and delivery system formats. Business is already using voice activated PCs that transmit audio, data, and voice to multiple locations simultaneously. Within the next few years it will be possible to send high quality education and training in an open entry - open exit format into a community agency, home, school site, or workplace. Genuine partnerships between education at all levels and the private sector are emerging and they will create a seamless articulated and integrated set of learning experiences with generic competencies and domain specific skills. Domain specific skills could include the standards for the 22 occupational projects funded by the U.S. Departments of Education and Labor.

A Communications Task Force (CTF) could provide direction for the program. The CTF could include private and public sector representatives listed in the strategic alliances section. The CTF could recommend projects that could be developed over the next few years. An AVTS, in partnership with postsecondary education and private sector establishments, could become the lead institution for communications technology in the region.

North Montco AVTS is preparing for strategic planning at the same time as Methacton, North Penn, Perkiomen Valley, Souderton, and Wissahickon. North Montco Programs include Health and Human Services Technology and Engineering Technology which are in a Tech Prep format with participating schools and with Penn State Ogontz and Montgomery County Community College.

North Montco has a Visual Communications Technology program that provides an extraordinary opportunity to help imagine the future. Few areas of study could be more exciting than an analysis of the invention of printing by the Chinese and its profound effect upon culture and education throughout the world. Exciting as the history of graphic arts and printing could be, however, the more challenging and vastly more critical area of study is understanding current trends in order to anticipate the future. The graphic arts and printing industry is undergoing fundamental changes in **prepress** and **press** functions. **Prepress** includes all functions in the creation and design of a product that will be printed and **press** includes all functions that relate to the printing of products. Some of the changes are having a profound impact on eduction. Teachers are creating their own textbooks on site through McGraw Hill's Primus program. "McGraw Hill Publications Online" includes over 50 periodicals. "Desktop Publishing and Design" is available in an online format from McGraw Hill.

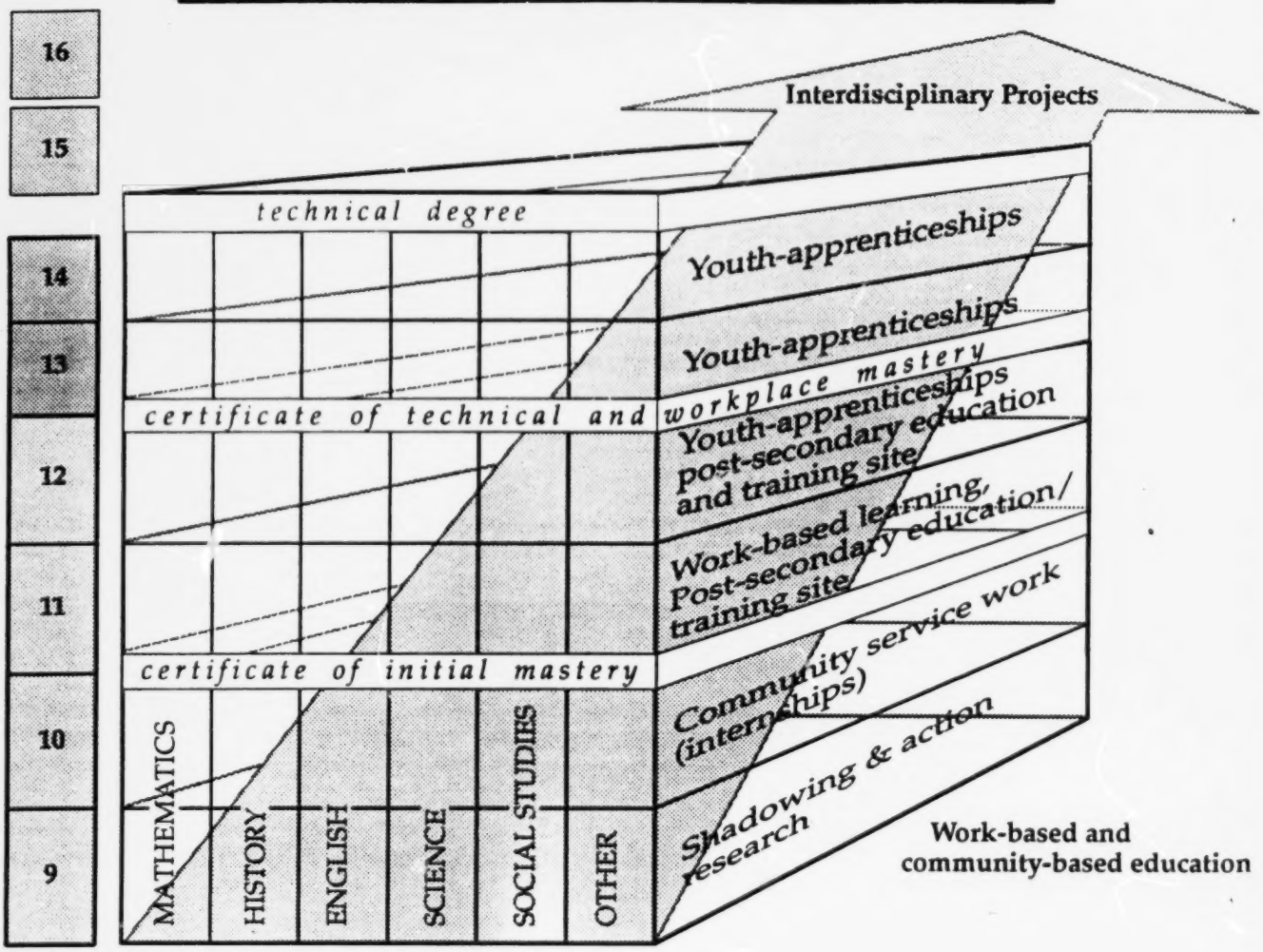
Imagine students involved in the strategic planning process and co-creating an image of life and work in the visual communication and printing and publishing industry and then helping create a multi-year action plan. Genuine partnerships could evolve between education and the private sector in an online format. Course outlines could be in an online format. Student projects could be developed online and transmitted electronically almost anywhere in the world. Horizontal integration and vertical articulation could be done online. Students could complete lower division general education core requirements online in a tech-prep format. Some of the introductory graphic arts and printing courses offered by postsecondary education could be completed in an online format within the existing tech-prep consortium and with other consortia throughout the state, particularly in rural and urban areas. The plan would be a proactive approach to creating a future for a program instead of merely adjusting to circumstances. The program prepares learner workers for a critical industry which uses rapidly changing communication and information technology.

Even more exciting is the prospect of involving "third wave" students at various levels in some collaborative interdisciplinary futuring project. Imagine a team of students from the above-mentioned programs collaborating on the creation of a **North Montco Free-Net** for culturally diverse people of all ages. Under the guidance of a team of professionals from education and the private sector, a group of students working toward performance-based outcomes at **Certificate of Initial Master, Certificate of Advanced Mastery,** and **Tech Prep Associate Degree** levels could create the Free-NET and then waves of other teams could continue to develop services to meet diverse needs in an electronic online format (see Attachment 15). What goals and objectives could be set to be accomplished by an AVTS and other participants in a tech-prep consortium? What goals can be set jointly with the Franklin Institute and the Technology Council of the Greater Philadelphia Area?

	1994-95	1995-96	1996-97	1997-98	1998-99	99-2000
	Plan to Plan	PLAN	Plan Implementation			Eval of Outcome
North Montco	••					
Methacton						
North Penn						
Perkiomen V.						
Souderton						
Wissahickon						
Montg Co CC						
Penn State O.						

Project S.M.A.R.T.

A collaborative venture of Cleveland Public Schools, Cuyahoga Community College, Cleveland Tomorrow, and Cleveland's Center for Advanced Manufacturing, BP America, and Youth Opportunities, Unlimited (an operating parter of the Cleveland Initiative for Education)



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3-D MATRIX LINKING SCHOOL-BASED TO WORK BASED LEARNING
(including youth apprenticeships and post-secondary institutions for grades 9-14)

prepared by Education Development Center, Inc. 1992

The Lancaster County Area Vocational-Technical Schools offer programs in Child Care and Graphic Arts. Half of the 20 school districts in the Lancaster-Lebanon Intermediate Unit are planning to plan for strategic planning in 1995-96. What goals and objectives could be collaborative set that relate to readiness to learn? What collaborative goals and objectives could be set for a Child Care career ladder program by LCAVTS, Harrisburg Area Community College, and Millersville University? What collaborative goals and objectives could be set in Graphic Arts between the three above-mentioned institutions and the Armstrong World Industries, Technomics Publishing, Research and Engineering Council of the Graphic Arts Industry in Chadds Ford and the Graphic Arts Technical Foundation in Pittsburgh which has the grant for the industry skills standards? Could goals be set to link students in China and the U.S. as suggested in slides in Appendix B?

Continuing and Graduate Education

The Academy could also serve as a broker between school district consumer needs and providers of continuing and graduate education. Continuing and graduate education in the past was based on provider controlled principles. Most graduate programs are submitted for program approval in a coherent plan but presented in a random manner at the convenience of the provider. It is assumed that an individual consumer will accumulate sufficient knowledge to ultimately solve problems in the work context. In many instances, a package does not mesh well with the context needs even through the program may be of high quality.

Strategic planning is based on data which will yield goals and objectives. A customer driven base of information can be the basis for continuing and graduate education. Needs assessment data by school districts with goals and objectives on readiness to learn could be the basis of a series of continuing or graduate education seminars at a site within an intermediate unit or school district. Or, imagine most of the seminars delivered in a multimedia format with some of the session online and delivered into home or school. The delivery system has been used for several years and is becoming qualitatively superior to traditional formats because it minimizes geographic, physical, and temporal limitations. The National Center on Postsecondary Teaching, Learning, and Assessment at The Pennsylvania State University could be valuable on research of online learning at the graduate level.

CONCLUSIONS

The world is undergoing fundamental restructuring. The European Community, the Pacific Rim countries, and the North American Free Trade Agreement countries are adjusting their economies in order to be the dominant region in the new world order. The nations, regions, and states that will be the beneficiaries of the structural change will be the ones that adjust and restructure systems and human resources development infrastructure to produce the knowledge workers who are needed for the new information era. All nations belonging to the Organisation for Economic Co-operation and Development are engaged in thinking strategically about the learning enterprise in the 21st Century.

The U.S. needs private and public sector establishments committed to inventing "Learning Communities" that empower humans to lead as opposed to merely adjusting to conditions. "Learning Communities" could accept a challenge such as "To design and perfect a human resources development system to produce knowledge workers of the 21st Century." While not all the knowledge is available to invent next generation learning systems, that must not deter us from striving toward such a goal. The words have a "future pull" magnetism to them that suggest that community leaders, practitioners, and scholars with expertise in theory, research and applications should be able to create bold, visionary systems with increased excellence, somewhat akin to New American Schools Development Corporation projects.

We are privileged to live during an extraordinary time, the turning of an era. We are surrounded with technologies which will fundamentally transform society and make possible the emergence of a learning enterprise with the potential to achieve higher levels of excellence and equality than can possibly be fully imagined by even the most experienced futurists. To achieve the dual mission priorities will require <u>New Habits of Mind and Heart</u>. Achievement of the mission priorities will require collectively focusing our minds on best practices and exemplary research to co-create visions of better systems and then having the heart to transform a preferred scenario into a multi-year action plan with appropriate resources.

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* * * * * * * * * *

What is not yet done
is only what we have not yet attempted to do.
-- DeTocqueville

APPENDIXES

A. Strategic Planning Within Intermediate Units

B. Relevant Information to Education Restructuring

* * * * * * * * * *

A "Third Wave" Electronic Institution

Judith W. Leslie uses Toffler's The Third Wave to develop an educational institution in an advanced technical era dominated primarily by electronic media.

> This methodology would allow the learner to proceed at his/her own rate and style, within his/her own time period, at his/her desired location, drawing upon learning materials from throughout the country and the world. Computer science and electronics courses and programs of study would be an integral part of the curriculum. Faculty would be cross-trained in a variety of disciplines and teaching styles. They would have flexible work schedules and loads and might share an assignment with a spouse or colleague. Many faculty would instruct from their home or electronic cottage....
>
> Judith W. Leslie. "As The Third Wave Approaches Higher Education: Planning For the Electronic Institution," CAUSE/EFFECT, January 1981, Vol. 4, No. 1, p. 15.

APPENDIX A

Strategic Planning Within Intermediate Units

12 Lincoln Intermediate Unit

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
12 Lincoln	8					
		6 + 2				
			11			

Phase	School District
1	Bermudian School District
3	Central York School District
1	Chambersburg Area School District
2	Conestoga Valley School District
3	Dallastown Area School District
1	Dover Area School District
2	Eastern York School District
3	Fannett-Metal School District
1	Fairfield Area School District
3	Gettysburg Area School District
2	Greencastle-Antrim School District
3	Hanover Public School District
3	Littletown Area School District
1	Northeastern School District
1	Red Lion School District
3	South Eastern School District
2	South Western School District
2	Southern York County School District
3	Spring Grove School District
2	Tuscarora School District
3	Upper Adams School District
1	Waynesboro Area School District
3	West York School District
3	York City School District
1	York Suburban School District

2	Franklin County Area Vocational-Technical School District
2	York County Area Vocational-Technical School District

13 Lancaster-Lebanon Intermediate Unit

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
13 Lancaster	6					
		4				
			10 + 4			

Phase	School District
1	Annville-Cleona School District
2	Cocalico School District
2	Columbia Boro School District
2	Conestoga Valley School District
3	Cornwall-Lebanon School District
1	Donegal School District
3	Eastern Lancaster School District
3	Eastern Lebanon County School District
1	Elizabethtown Area School District
1	Ephrata Area School District
1	Lampeter-Strasburg School District
3	Lancaster School District
2	Lebanon School District
1	Manheim Central School Distict
3	Manheim Township School District
3	Northern Lebanon School District
3	Palmyra Area School District
3	Penn Manor School District
3	Pequea Valley School District
3	Solanco School District
3	Lancaster Co AVTS - Brownstown
3	Lancaster Co AVTS - Mt. Joy
3	Lancaster Co AVTS - Willow Street
3	Lebanon Co AVTS

14 Berks County Intermediate Unit

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
14 Berks	8					
		5 + 2				
			5			

Phase	School District
3	Antietam School district
1	Boyertown School District
1	Brandywine Heights Area School District
1	Conrad Weiser Area School District
3	Daniel Boone Area School District
2	Exeter Township School District
2	Fleetwood Area School District
1	Governor Mifflin School District
1	Hamburg Area School District
1	Kutztown Area School District
2	Muhlenberg School District
1	Oley Valley School District
1	Reading School District
2	Schuylkill Valley School District
3	Tulpehocken Area School District
3	Twin Valley School District
2	Wilson School District
3	Wyomissing Area School District
2	Berks County AVTS-East
	Berks County AVTS-West
2	Reading-Muhlenberg AVTS

15 Capitol Intermediate Unit

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
15 Capitol	9					
		6 + 1				
			9 + 2			

Phase	School District
2	Big Spring School District
2	Camp Hill School District
3	Carlisle Area School District
3	Central Dauphin School District
3	Cumberland Valley School District
2	Derry Township School District
1	East Pennsboro Area School District
2	Greenwood School District
1	Halifax Area School District
1	Harrisburgh School District
1	Lower Dauphin School District
3	Mechanicsburg Area School District
1	Middletown Area School District
3	Millersburg Area School District
3	Newport School District
1	Northern York County School District
3	Shippensburg Area School District
1	South Middleton School District
1	Steelton-Highspire School District
3	Susquehanna Township School District
2	Susquenita School District
3	Upper Dauphin Area School District
2	West Perry School District
1	West Shore School District
3	Cumberland-Perry Area Vocational-Technical School
2	Dauphin County Vocational-Technical School
3	Harrisburg-Steelton-Highspire Vocational-Technical School

20 Colonial Northampton Intermediate Unit

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
20 Colonial	4					
		3				
			6 + 2			

Phase	School District
3	Bangor Area School District
2	Bethlehem Area School District
1	Delaware Valley School District
1	East Stroudsburg Area School District
2	Easton Area School District
3	Nazareth Area School District
1	Northampton Area School District
2	Pen Argyl Area Schol District
3	Pleasant Valley School District
1	Pocono Mountain School District
3	Saucon Valley School District
3	Stroudsburg Area School District
3	Wilson Area School District

3	Bethlehem Area Vocational-Technical School
3	Eastern Northampton Area Vocational-Technical School

21 Carbon-Lehigh Intermediate Unit

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
21 Carbon	1					
		4				
			9 + 2			

Phase	School District
3	Allentown City School District
3	Catasauqua Area School District
3	East Penn School District
2	Jim Thorpe Area School District
3	Lehighton Area School District
3	Northern Lehigh School District
1	Northwestern Lehigh School District
3	Palmerton Area School District
3	Panther Valley School District
2	Parkland School District
3	Salisbury Township School District
2	Southern Lehigh School District
2	Weatherly Area School District
3	Whitehall-Coplay School District
3	Carbon County Area Vocational-Technical Schools
3	Lehigh County Area Vocational-Technical Schools

22 Bucks County Intermediate Unit

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
22 Bucks	7					
		5 + 1				
			1 + 2			

Phase	School District
2	Bensalem Township School District
1	Bristol Borough School District
2	Bristol Township School District
1	Centennial School District
1	Central Bucks School District
1	Council Rock School District
2	Morrisville School District
1	Neshaminy School District
2	New Hope-Solebury School District
1	Palisades School District
2	Pennridge School District
1	Pennsbury School District
2	Quakertown Community School District
3	Bucks County Area Vocational-Technical School
2	Middle Bucks Area Vocational-Technical School
3	Upper Bucks County Area Vocational-Technical School

23 Montgomery County Intermediate Unit

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
23 Montg	3					
		3 + 1				
			15 + 3			

Phase	School District
3	Abington School District
	Bryn Athyn School District
3	Cheltenham Township School District
3	Colonial School District
1	Hatboro-Horsham School District
2	School District of Jenkintown
3	Lower Merion School District
3	Lower Moreland Township School District
3	Methacton School District (North AVTS)
1	Norristown Area School District
3	North Penn School District (North AVTS)
3	Perkiomen Valley School District (North AVTS)
3	Pottsgrove School District
3	Pottstown School District
3	Souderton Area School District (North AVTS)
3	Spring-Ford Area School District
1	School District of Springfield Township
2	School District of Upper Dublin
3	Upper Dublin School District
2	Upper Merion Area School District
3	Upper Moreland Township School District
3	Upper Perkiomen School District
3	Wissahickon School District (North AVTS)
3	Central Montgomery County Area Vocational-Technical Sch
3	Eastern Montgomery County Area Vocational-Technical Sch
3	North Montgomery County Area Vocational-Technical Sch
2	Western Montgomery County Area Vocational-Technical Sch

24 Chester County Intermediate Unit

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
24 Chester	2					
		5 + 1				
			5			

Phase	School District
3	Avon Grove School District
1	Coatesville Area School District
2	Downingtown Area School District
3	Great Valley School District
2	Kennett Consolidated School District
2	Octorara Area School District
3	Owen J. Roberts School District
2	Oxford Area School District
1	Phoenixville Area School District
3	Tredyffrin/Easttown School District
3	Unionville-Chadds Ford School District
2	West Chester Area School District
2	Center for Arts and Technology - Brandywine
	Center for Arts and Technology - Pickering

25 Delaware County Intermediate Unit

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
25 Delaware	5	5	5 + 2			

Phase	School District
3	Chester-Upland School District
3	Chichester School District
2	Garnet Valley School District
3	Haverford Township School District
1	Interboro School District
1	Marple Newtown School District
1	Penn Delco School District
2	Radnor Township School District
1	Ridley School District
3	Rose Tree Media School District
2	Southeast Delco School District
1	Springfield School District
2	Upper Darby School District
3	Wallingford-Swathmore School District
2	William Penn School Distict
3	Delaware County AVTS - Aston
3	Delaware County AVTS - Folcroft

29 Schuylkill Intermediate Unit

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
29 Schuylkill	4	4 + 1	4			

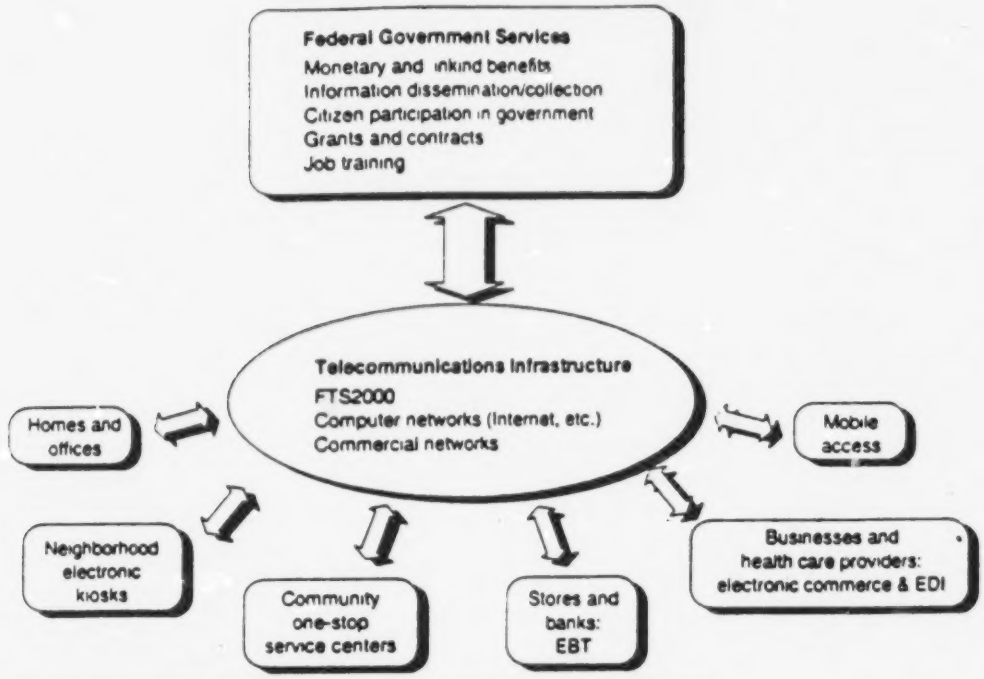
Phase	School District
1	Blue Mountain School District
2	Mahony Area School Distict
3	Minersville Area School District
2	North Schuykill School District
3	Pine Grove Area School District
1	Pottsville Area School District
1	Saint Clair Area School District
3	Schuylkill Haven Area School District
3	Shenandoah Valley School District
2	Tamaqua Area School District
2	Tri-Valley School District
1	Williams Valley School District

2	Schuylkill County Area Vocational-Technical School
	Schuylkill County Area Vocational-Technical School North
	Schuylkill County Area Vocational-Technical School South

APPENDIX B

Relevant Information to Education Restructuring

Figure 3-1—Role of Telecommunications Infrastructure in Delivering Federal Services Via Six Points of Access

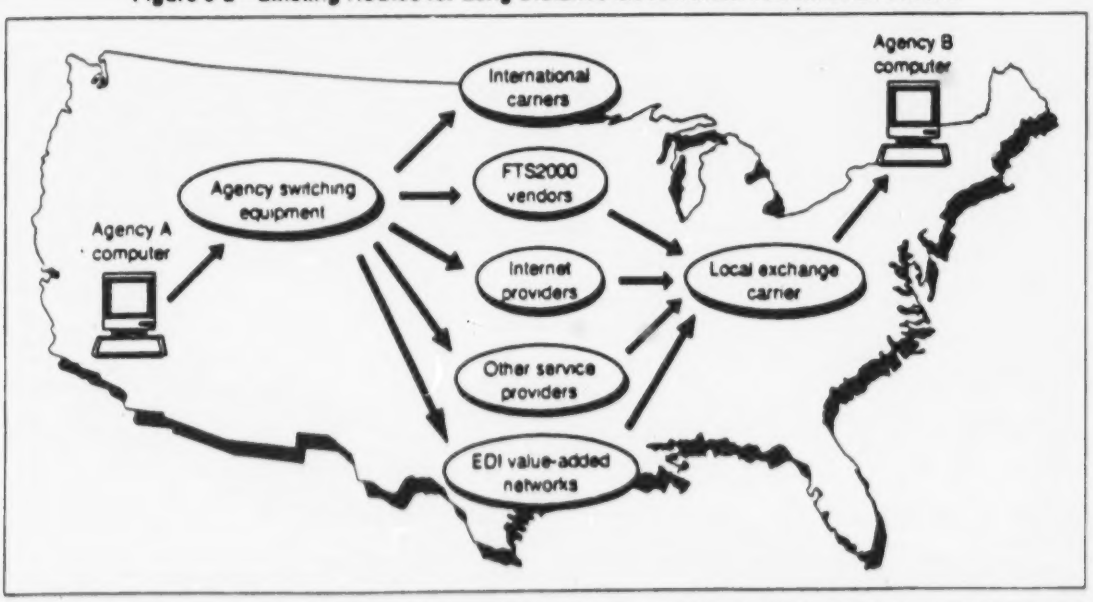


NOTE: The Federal services and infrastructure components shown are illustrative, not comprehensive.

KEY: EBT=Electronic Benefits Transfer; EDI=Electronic Data Interchange; FTS2000=the Federal long-distance telecommunications program.

SOURCE: Office of Technology Assessment, 1993.

Figure 3-2—Existing Routes for Long-Distance Government Telecommunications



NOTE: The routes shown are illustrative. In this example, the sending agency (Agency A) switches the data directly to the appropriate telecommunications provider. At the receiving end, the local exchange carrier switches the data to the receiving agency (Agency B).

KEY: EDI=Electronic Data Interchange; FTS2000=Federal long-distance telecommunications program.

SOURCE: Office of Technology Assessment, 1993.

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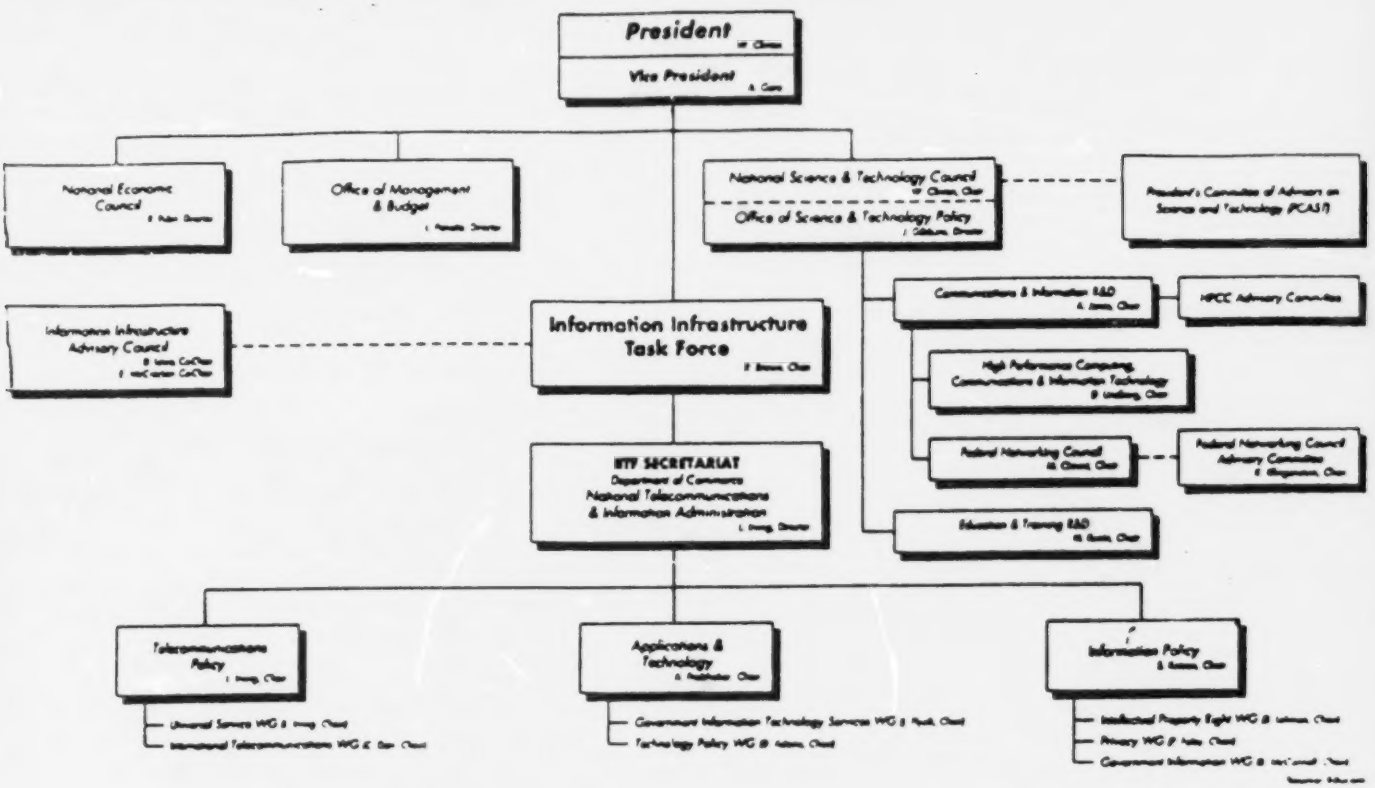
ORGANIZATION OF U.S. NATIONAL INFORMATION INFRASTRUCTURE INITIATIVE



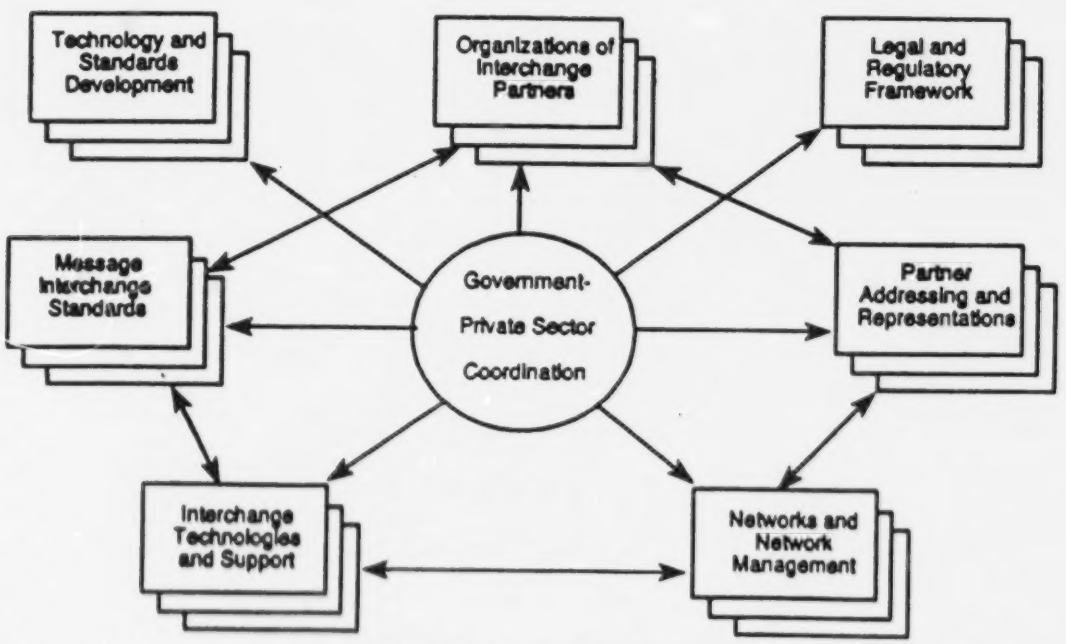


Figure 1. Planning for Global Electronic Commerce.

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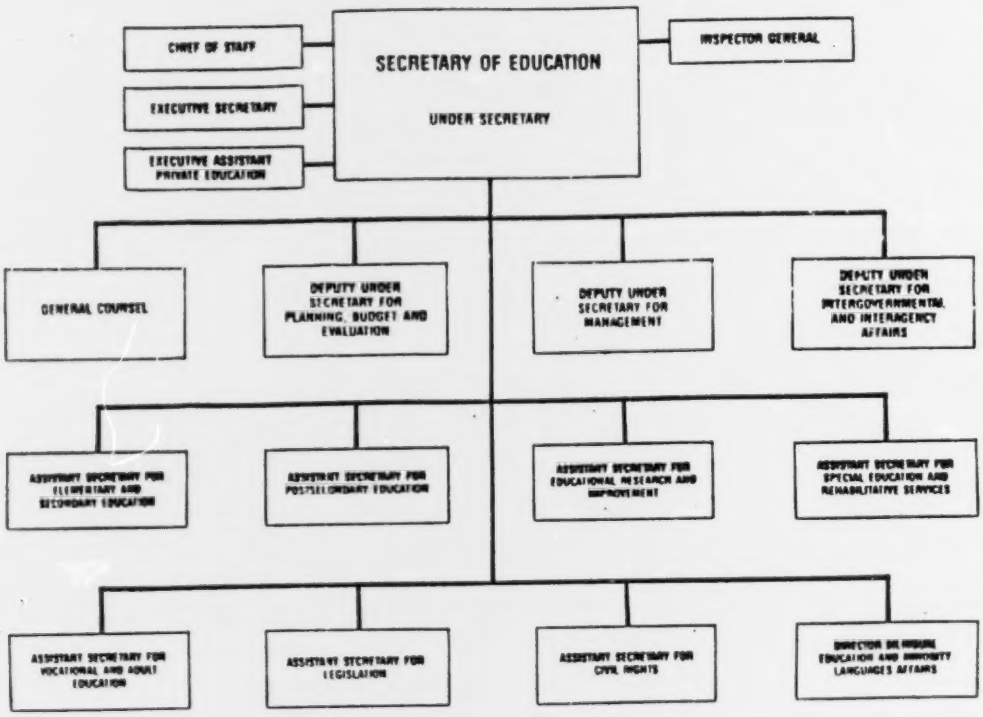
U.S. DEPARTMENT OF EDUCATION


CHIEF OF STAFF
EXECUTIVE SECRETARY
EXECUTIVE ASSISTANT PRIVATE EDUCATION
SECRETARY OF EDUCATION
UNDER SECRETARY
INSPECTOR GENERAL
GENERAL COUNSEL
DEPUTY UNDER SECRETARY FOR PLANNING, BUDGET AND EVALUATION
DEPUTY UNDER SECRETARY FOR MANAGEMENT
DEPUTY UNDER SECRETARY FOR INTERGOVERNMENTAL AND INTERAGENCY AFFAIRS
ASSISTANT SECRETARY FOR ELEMENTARY AND SECONDARY EDUCATION
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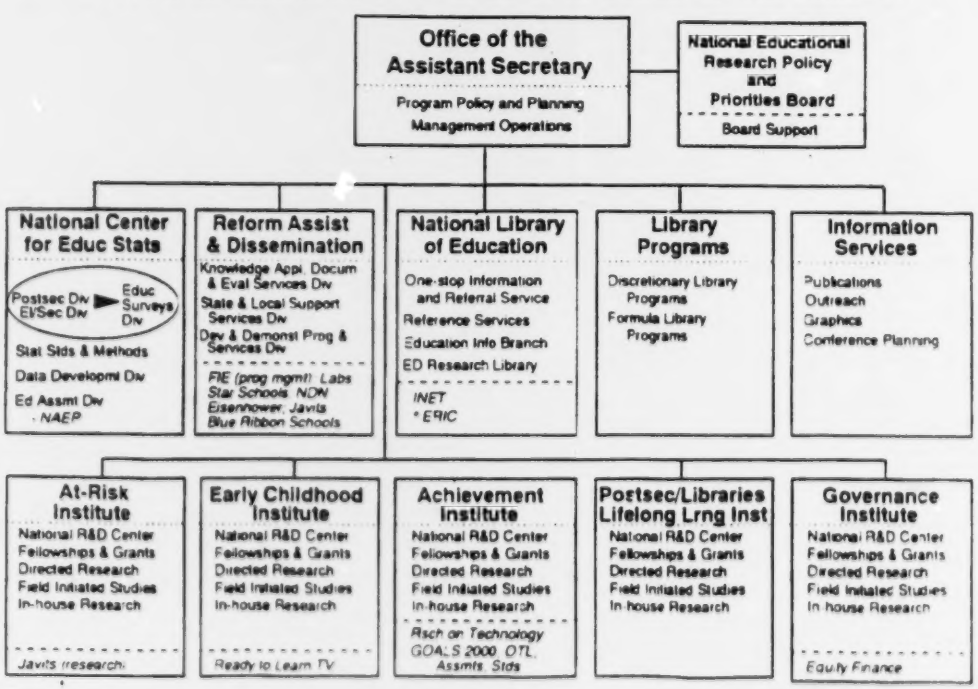
ASSISTANT SECRETARY FOR LEGISLATION
ASSISTANT SECRETARY FOR CIVIL RIGHTS
DIRECTOR OF BILINGUAL EDUCATION AND MINORITY LANGUAGES AFFAIRS

PROPOSED ORGANIZATIONAL CHART

OFFICE OF EDUCATIONAL RESEARCH AND IMPROVEMENT



* Requires technical legislative amendment

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Executive Office of the President
Office of Science and Technology Policy

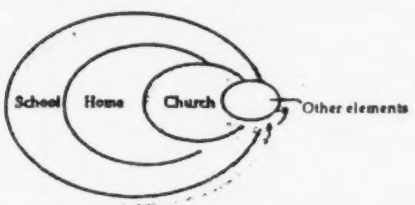
Ed Fitzsimmons
Special Assistant for Education & Training

Societal Learning System

OSTP

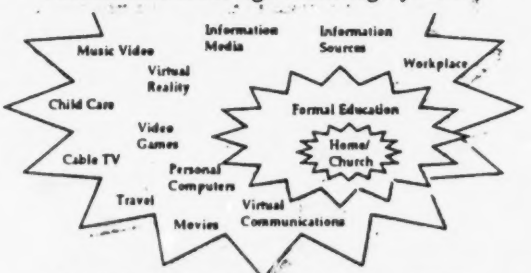
There are multiple and dramatic changes that are strongly influencing the way we learn

Industrial Age Learning System



- The dominant elements of learning that had direct access to the individual were home, school, and church
- A consistent message was sent by the three dominant elements and was generally reinforced by other elements of learning
- The character of the individual and the criteria for future success were substantially agreed to by society and were clearly defined and communicated

Communications Age Learning System



- A new society is evolving from radical new forms of learning that compose a new societal learning system
- Increasingly, learning now takes place randomly and learners receive conflicting messages
- There is no dominant element of learning–all elements can have equal influence on the individual learner

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ADVANCED TECHNOLOGY PROGRAM

Objective:

Promote U.S. economic growth through development and application of technology

ATP CHARACTERISTICS

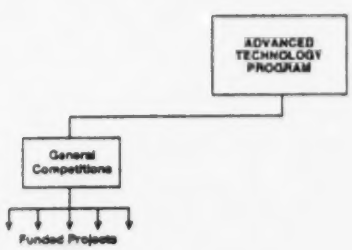
- High-risk technology development
- For-profit companies of all size
- Cost-sharing by industry
- Collaborations / Strategic Alliances Encouraged
- Fair, Open and Rigorous Competition
- Technical and Business Merit
- No ATP funding for commercialization
- Emphasis on commercialization
- Cooperative Research Agreements

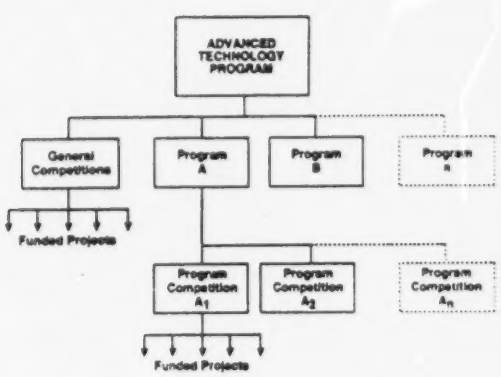
ADVANCED TECHNOLOGY PROGRAM: Status

- 4 Competitions Completed
- 1,000 Projects Totalling $3 Billion of R&D Proposed
- 89 Projects Totalling $500 Million of R&D Funded
- Planned Scale-up of Program from $10 Million to $750 Million

BENEFITS FROM ATP PARTICIPATION

- Expanded R&D Funding
- Collaboration on Shared Problems
- Ultimate Benefit to U.S. Economy
- Opportunities for Strategic Business Alliances
- Improved Ability to Attract Investors
- Cost and Time Savings from Collaboration
- Improved Competitive Standing



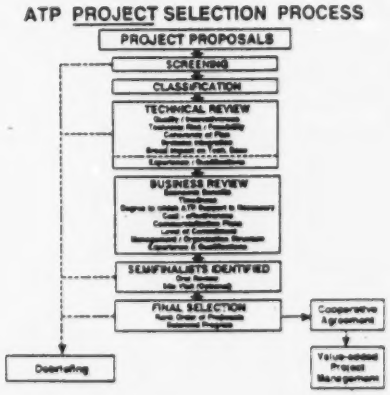


ATP PROJECT TYPES

- Individual companies
  - No more than 3 years
  - Up to $2 million total
  - NIST pays only direct costs
- Joint ventures
  - No more than 5 years
  - No limit on award amount
  - NIST share less than 50%

No direct funding to universities, government agencies or non-profit independent research institutes

ATP PROJECT SELECTION PROCESS



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West Chester University

Center for the Study of Connectivity and Data Bases (CS/C&DB)

West Chester
Pennsylvania 19383
(215) 436-3337
FAX (215) 436-3110

CHESCOnet

CHESCOnet has been created in an effort to enable and encourage all Chester County governmental units, libraries, educational institutions, businesses, other organizations, and individuals to participate in a county-wide digital network with wide area connectivity to sources of digital information such as Chester County government and to other digital information networks including the Internet.

Definition
CHESCOnet is a high-speed information network, governed by a management board, operated by the Center for the Study of Connectivity and Databases (CS/C&DB) of West Chester University, and funded by CHESCOnet members through annual contributions.

Mission
CHESCOnet will provide a cost-effective computer network information infrastructure, to facilitate information access and exchange among Chester County libraries, educational institutions, businesses, non-profit agencies, general public, governmental units, and other constituent groups.

Operation
CHESCOnet is governed by a management board appointed by the Chester County Commissioners. CHESCOnet is a TCP/IP wide area network operated by the CS/C&DB which provides those services typically supplied by a network information center (NIC). The single point of contact for CHESCOnet is the CHESCOnet program coordinator, who is a member of the NIC. CHESCOnet is provided an Internet backdoor connection by the CS/C&DB, WCU, the Pennsylvania State System of Higher Education (SSHE), and the Pennsylvania Research and Economic Partnership (PREPnet), a National Science Foundation (NSF) mid-level Internet network provider.

Membership
All members of Chester County are encouraged to make use of the opportunities afforded by CHESCOnet. One can become a member of CHESCOnet by payment of the annual fees; adhering to the CHESCOnet published guidelines, policies, and procedures; and utilizing the Internet according to the PREPnet Acceptable Use Policy (AUP). CHESCOnet is a member of PREPnet, as are the CS/C&DB, WCU, and SSHE. All members of CHESCOnet are members of PREPnet by virtue of their CHESCOnet membership. CHESCOnet will accept members outside Chester County which are involved in activities within Chester County in accordance to existing policy and fee structure.

For additional information on CHESCOnet please contact Mr. Steve Grabicki at (610) 344-6475.

CHESCOnet

CHESCOnet is a county-wide, high-speed, wide area digital network, governed by a management board, operated by the Center for the Study of Connectivity and Databases (CS/C&DB) of West Chester University (WCU), and funded by CHESCOnet members through annual contributions.

CHESCOnet's mission is to provide a cost effective computer network infrastructure to facilitate information access and exchange among Chester County libraries, educational institutions, businesses, non-profit agencies, governmental units, community organizations, the general public, and other members of the Internet community.

WHAT CAN CHESCOnet OFFER K-12 EDUCATORS?

I. Expand the Range and Scope of Classroom Resources Through Access to Local, State, National, and International Sources of Information

- Search the Library of Congress catalog and explore other library catalogues worldwide.
- Collect educational information from resources such as ERIC, NASA Spacelink, and KIDLINK.
- Access documents like the National Performance Review, Health Security Plan, Family & Medical Leave Act, 1995 Federal Budget Proposal, and NAFTA.
- Access Health and Medical information from the National Library of Medicine, National Institute of Health, and the Food and Drug Administration.

II. Enhance the Learning Process

- Improve the quality of education by providing innovative, progressive services.
- Facilitate communication with students worldwide.
- Serve as the link between students and an increasingly changing and technological world.
- Support individual and group projects, collaboration, and idea sharing.
- Heighten or awaken new interests on a variety of subjects.

III. Augment Professional Growth

- Communicate with colleagues around the world about problems and topics of mutual interest.
- Keep informed on current issues and research projects.

VI. Streamline Existing Operations

- Allow for pooling and sharing of resources.
- Facilitate intra-school and inter-school teamwork.

*For More Information On How **CHESCOnet** Can Improve Your School,*
*Call **(610) 436-3337** OR Send E-mail To **chesconet@wcupa.edu***

CHESCOnet

CHESCOnet is a county-wide, high-speed, wide area digital network, governed by a management board, operated by the Center for the Study of Connectivity and Databases (CS/C&DB) of West Chester University (WCU), and funded by CHESCOnet members through annual contributions.

CHESCOnet's mission is to provide a cost effective computer network infrastructure to facilitate information access and exchange among Chester County libraries, educational institutions, businesses, non-profit agencies, governmental units, community organizations, the general public, and other members of the Internet community.

WHAT CAN CHESCOnet OFFER LIBRARIES?

I. Improve Reference by Expanding the Range and Scope of Access to Local, State, National, and International Sources of Information

- Access Health and Medical information from the National Library of Medicine, National Institute of Health, and the Food and Drug Administration.
- Search the Library of Congress catalog and explore other library catalogues worldwide.
- Collect data from databases such as the SEC's EDGAR Database, the U.S. Department of Agriculture's Economics and Statistics Database, and the U.S. Commerce Department's National Trade Data Bank.
- Access documents like the National Performance Review, Health Security Plan, Family & Medical Leave Act, 1995 Federal Budget Proposal, and NAFTA.

II. Enhance Leadership Role Within the Community

- Serve as the intermediary between the community and the evolving network of electronic information.
- Improve the quality of life for patrons by providing innovative, progressive services.
- Facilitate communication with local, state, and federally elected officials and agencies.

III. Increase Support for Lifelong Learning

- Strengthen literacy and adult education programs through the use of Literacy Forums and discussion groups.
- Heighten or awaken new interests on a variety of subjects.

IV. Attract New Patrons

V. Promote Economic Development

- Provide businesses and entrepreneurs with local, state, and federal demographic data, contract and bidding opportunities, and economic statistics.
- Allow for pooling and sharing of resources.
- Facilitate access to high-quality employee pools.

VI. Augment Professional Growth

- Communicate with colleagues around the world about problems and topics of mutual interest.
- Stay abreast of current issues.

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The professor is on-line

By Paul Fraser

Nova Scotia's new Collège de L'Acadie is pioneering a truly interactive learning environment in which students at various locations can carry on conversations with their professor and with each other.

At first glance, there is a sinister, almost Orwellian appearance to this classroom. A camera, barely visible in a recessed cabinet at the front of the room, trains its mute eye on the room. Three video screens built into the cabinet flicker with electronic life. Another camera at the back of the room gazes down. Black microphones dangle from the ceiling tiles. In the centre of the room, eight adults work at computer terminals.

But this isn't a post-1984 scenario. And far from being sinister, what's happening is part of an experiment helping spread education to students who wouldn't have been able to take advantage of it before Collège de L'Acadie came along.

The francophone Nova Scotia Community College, based in Saulnierville in the south western end of the province, has six "classrooms" scattered around the province. It's pioneering one of the world's most advanced interactive learning environments through the use of video-conferencing and tele-conferencing systems. The college is the first to put the two technologies together to teach technical and professional courses.

Chief executive officer Réal Samson says he even hopes to teach hands-on trades, traditionally limited to the workshop, in two years. "The day we offer our first mechanics course, that will be pioneering," he says.

In September 1992, the college began offering four programs: business computing, accounting, secretarial skills and academic upgrading. About 500 part-time and more than 90 full-time students enrolled – more than double the college's expectations.

The six classrooms – in primarily Acadians communities like Comeauville, Tusket, Petit de Grat, St.-Joseph-du-Moine and Pomquet, as well as in Dartmouth – are linked via dedicated telephone lines.

Thanks to the cameras and microphones in each centre, a teacher in one classroom can teach students simultaneously in all the others. Students in another centre can ask questions and hear and see the teacher's response. They can also hear and see students in other centres asking questions. Students can see the teacher's written work on the video screen, and the teacher can use the cameras to zoom in on a student's computer terminal.

The separate tele-conferencing system, called Vis-a-Vis, allows a student to do work on a computer screen and have it simultaneously edited by a teacher in another centre. Students can also send still photos or faxes to each centre. Student and teacher communicate by voice.

The college invested about $700,000 in equipment, says Samson, then MT&T, through a new service application called DESK (Distance Education Service for Knowledge), reduced the college's long-distance bill to about $200,000 per year from a projected $1 million, he says

The 12 full-time and 35 part-time teachers had to be trained to use the new technology. Interesting problems did arise – what happens when a storm keeps students or a teacher at one centre from attending class, but not the others? "We had to move quickly in areas we'd never thought of before," says Samson.

The college's technology is a sign of things to come in the educational field. "If it isn't, I think we're missing out on something," he adds. "(This system) is both cost-effective and offers enhanced educational opportunities."

Donald Kenny, Director of the Collège de L'Acadie with student Lucie Bouchard in the video and tele-conferencing classroom.

And the technology knows no provincial or national boundaries. "We can give a student the best in the world," says Samson. "A lecturer doesn't have to come from Nova Scotia or Canada. He could be anywhere in the world."

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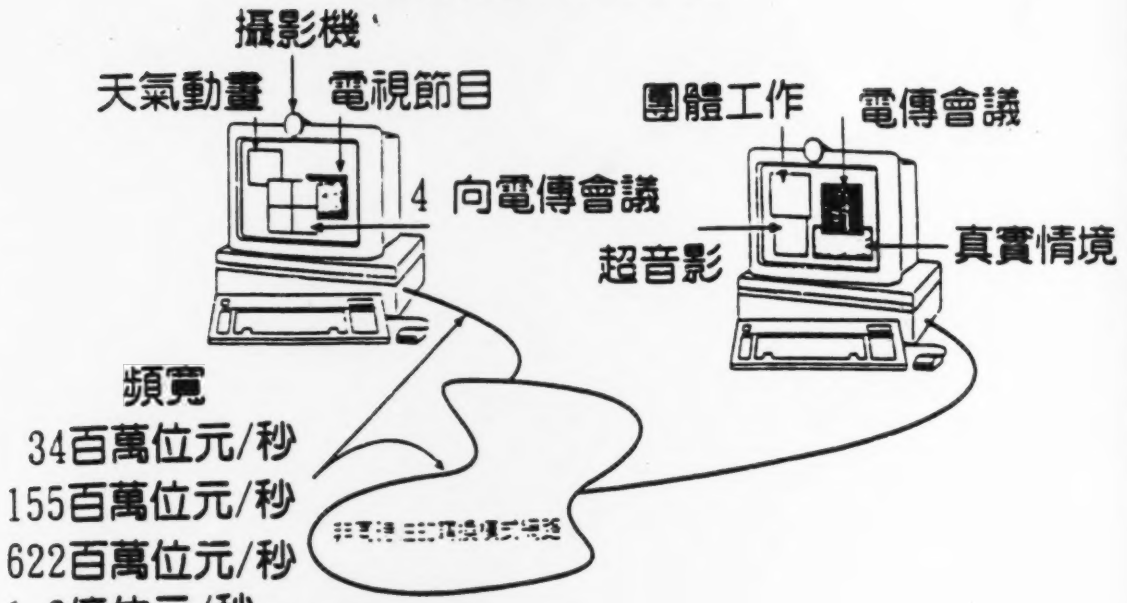

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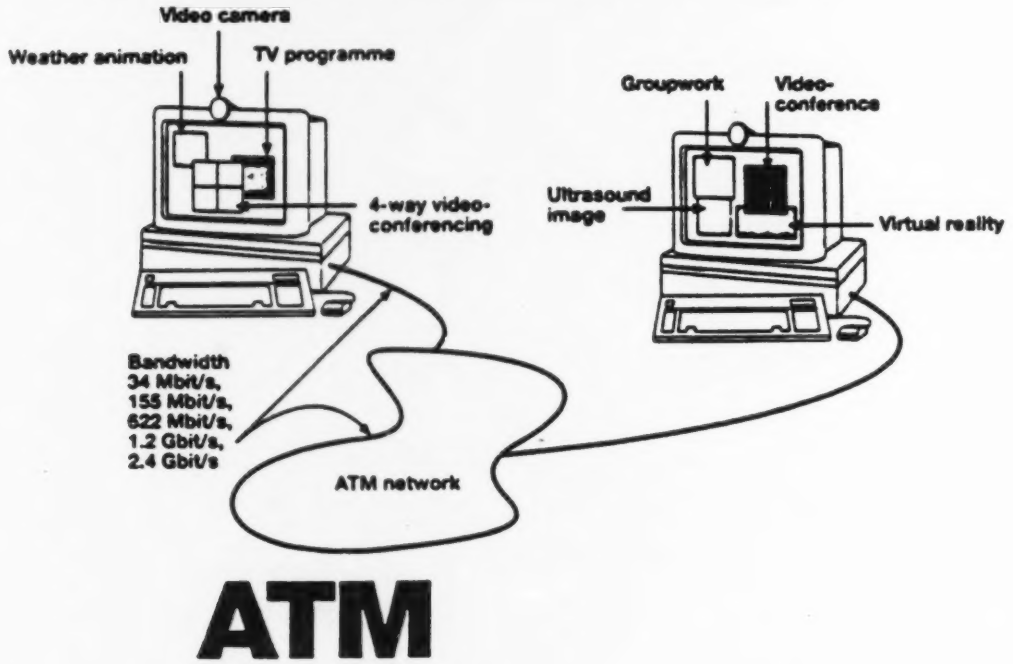

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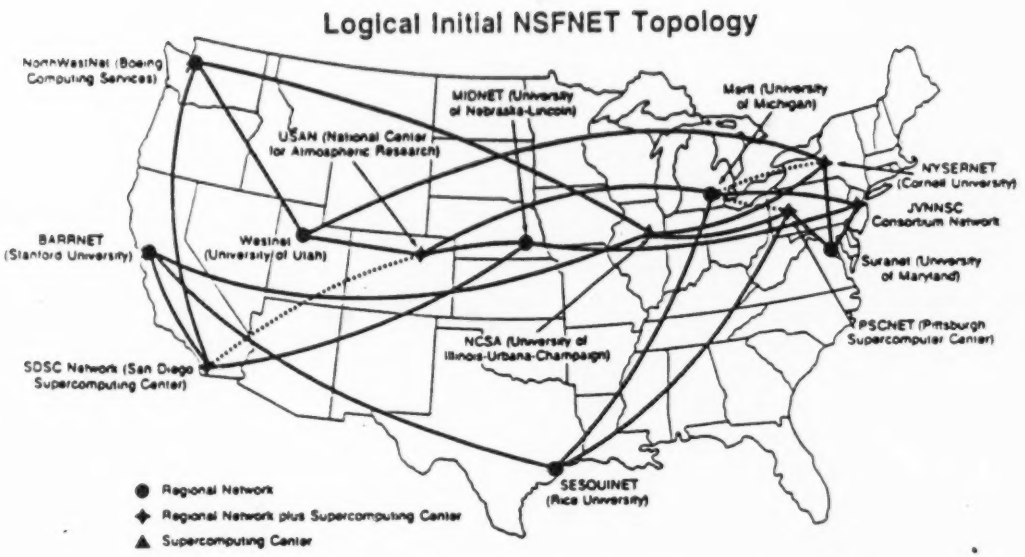

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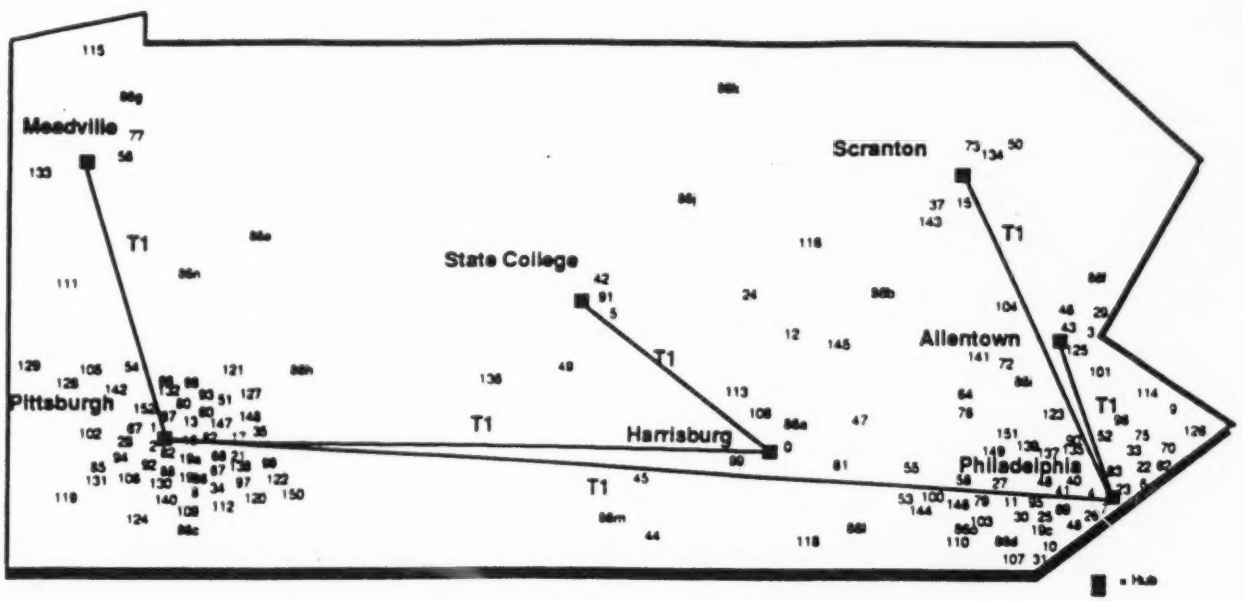

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